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Indigenous Knowledge: Implications for the Theory and Practice of Agricultural Education and Extension

by

AHMAD SABETGHADAM ©

A thesis submitted to the Faculty of Graduate Studies and Research
In partial fulfillment of the requirements for the degree of
Doctor of Philosophy

in

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Date: May 16, 2003

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Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Indigenous Knowledge: Implications for the Theory and Practice of Agricultural Education and Extension submitted by Ahmad Sabetghadam in partial fulfillment of the requirements for the degree of Doctor of Philosophy in International/Intercultural Education.

Dr. V. Judy Atkinson
(External)

Date: May 14, 2003

Thesis Dedication

I would like to dedicate this thesis to people who have been a great source of support and inspiration. These people are Mashe-Ferang, my Grandparents, my Parents, my Brother and Sister, my Teachers, my Wife, my Children, and last but not least my Spiritual Guide (my Supervisor, Dr. Peggy Wilson and my Mentor, Dr. Stan Wilson). My gift to them is the following poem with its sacred meanings, a key to open the gateway to our inner nature, to unlock our Divine Wisdom, and to break barriers and build bridges between and among all people who seek for One and that only One is:

I am neither Christian nor Jew, Zoroastrian nor Moslem.
I am not of the East, the West, the land, or the sea;
I'm not of Nature's mint, nor of the circling heavens.
I'm not of earth, water, air, fire;
I'm not of the empyrean, nor of the dust, nor of existence, nor of entity.
I'm not from India, China, Bulgaria, or Turkestan;
I am neither from Mesopotamia nor from Iran.
I'm not of this world or the next, nor of Paradise or Hell;
I am not of Adam or Eve, nor of Eden and Paradise.
My place is the Placeless, my trace is the Traceless;
It is neither body nor soul: I belong to the Soul of Beloved,
I have put duality away and have seen the two worlds as one;
I seek only one, I know, see, and call only one.
He is the first and the last, the outward and the inward;
I know none other than "O lord" and "O lord, lord."

Jalaladdin Rumi, Selected Poems From the Divani Shamsi Tabriz, 124

Abstract

Using a qualitative approach to examine agricultural extension documents, this research examines the philosophical and ideological aspects of agricultural extension with respect to its sensitivity toward indigenous knowledge.

The research shows that, in the evolution of agricultural extension theories and practices, local and/or indigenous knowledge has been devalued and deemed irrelevant to the goals and strategies of modern agricultural development. However, an emerging group of scholars suggest a need for agricultural scientists and policy-makers to look closely at the limitations of the dominant approaches based on the modernization paradigm of "development" and to incorporate local and indigenous knowledge into their practices. This study seeks to take on the challenge of articulating a systematic alternative framework for agricultural extension programs that meaningfully integrates indigenous knowledge into the theory and practice of agricultural extension programs.

The accumulated wisdom of local peoples, both indigenous and non-indigenous is crucial to the survival of future generations. The legitimation and incorporation of this knowledge into agricultural extension programs may in fact create a needed bridge between modern and traditional science, thus providing a crucial link for the survival of future generations.

Acknowledgements

I wrote this thesis to plant, cultivate, and harvest kindness. Kindness is of paramount importance to me, because life and love is nothing but kindness. Helping others is what keeps me alive. It generates kindness and it is my fuel to rejuvenate, continue living, and foster change in me so that I can become a better human.

I have put a great deal of heartfelt thought into this thesis. For me it has been a passion and a work of love. All together it has been a very fruitful learning experience for me. During the whole process of writing I experienced challenging times as I struggled with numerous unexpected events and obstacles that conflicted with my personal, family, and social value. I had to challenge, tolerate, respect, and accept everything as a natural life process (discourse). These struggles and challenges affected me mentally, spiritually, emotionally, and physically. If it was not for the kindness of many people especially four loving individuals, Dr. Peggy Wilson, Dr. Stan Wilson, Dr. Ali Abdi, and Mrs. Chris Prokop I would have never been able to complete this thesis at all. They went beyond the ordinary student-professor relationship and helped me at many levels through their unconditional kindness, encouragement, and wisdom. Mere word cannot express my gratitude. You are wonderful people with beautiful hearts and brilliant positive intention.

I would also like to thank Dr. Assheton-Smith, Dr. Dahara Gill, Dr. Frank Peters, Dr. David Wangler, Dr. Swee-Hin Toh, Dr. Judy Atkinson, Dr. Virginia Cawagas, Dr. Sue Scott, and Dr. Kazim Bacchus, for their exceptional kindness and continuing support.

How could I ever be able to express in ordinary, human, words the love and gratitude I feel for members of my family (my wife, Aghdas; my daughter, Nafysseh; and my sons, Hossein and Ali Reza) and my Mother, my Father, my Brother and my Sister. Their unconditional support and love and prayers have guided me every step of the way.

Along the way I have found many good friends and I have received a lot of inspiration from each and every one of them. Thank you for all your kind messages, they really made a big difference. Last but not the least, I have found a new friend, Nathan Lario whose patient and skilful editorial work has made everything possible.

The warm welcome and positive attitude of faculty and staff are the most important assets of the University of Alberta. It surely is a testimony to the attractiveness of university as a home for students and their families from overseas.

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Chapter 1: Introduction

Background

This study stems from one of the sweetest memories of my childhood in Iran, the memory of *Mashe-Ferang (Ma-she-Fe-rang)*[1]. I was a six year old adventurous boy with an almost infinite enthusiasm to learn. I have only the most vivid memories of *Mashe-Ferang*, but I do not recall her calling me by my name, Ahmad (Ah-mad), or my nickname, Behnam (Beh-nawm). Instead, she addressed me by lovely expressions such as "the light of my eye (Noo-re Chash-me Man)," "the fruit of my life (Mee-veh-ye Zen-de-gee-ye Man)," "the candle of my heart (Sham-e Ghal-be Man)," "my honey-sugar boy (Pe-sa-re Ghan-de A-sa-lam)," and "my flower boy (Pe-sa-re Go-lam)." She was a great storyteller. She collected the seeds from different melons and roasted them after they were sun-dried. She told us we must never throw these seeds into the garbage. "These seeds have nutritious value and you must eat them or plant them," she would say. My older brother, my younger sister, and I used to sit around her at night to listen to her sweet moral and educational stories. As she spoke, she gave us such strikingly beautiful names as "my butterfly," "my canary," and "my nightingale." As she talked, she would crack the shell of the melon seeds so that we, in turn, could dig out the seed and eat it. We enjoyed this very much and soon became expert at cracking the seeds all by ourselves. She taught us how to crack the shell from many nuts such as walnuts and almonds.

Bread, rice, eggs, milk, and potatoes were our main food sources. *Mashe-Ferang* used to buy her own wheat and get it ground to produce flour to make bread. She always told us, my parents in particular, to feed us with the breads she made. And I loved her homemade breads. She had no faith in the breads we bought from the bakery. She told us that the bread from the bakery was not as nutritious and we would have to eat a lot more of it to feel full, only we wound end up getting stomach bloat as well. *Mashe-Ferang* told us that the bread from the market never tasted the same as her homemade bread and that I can remember and attest to.

---

[1] Mashe-Ferang (an Indigenous Kurdish woman): lived with us like a non-biological grandmother.

Additionally, when we used store-bought bread we would have significant leftovers due to the low quality of the baking and the salty taste of the bread. Therefore, some of the bread had to be fed to the animals. I also remember how people called *Na-ma-kee* (salt seller) would come and trade *Na-mak* (salt) for our leftover bread, which they then collected and sold to farmers who raised domestic animals.

Much the same story could be told about the imported rice in comparison to the locally produced rice. The locally produced rice tasted a lot better. You did not have to cook it as much and with a lesser amount you could feel full and stay full for a longer time. The satisfaction to be gained from eating local rice, however, went beyond the flavour or the cost, for there was also the question of benefiting the local families and producers.

I wish that I could have known then what I know now. I wish too that my *Mashe-Ferang* could see that the wisdom she planted in me started germinating after so many years of dormancy, and now I feel responsible for carrying on her message with the hope that the blossoms of her wisdom will produce new seeds in the hearts and minds of new generations. I wish I could tell her, "Yes, my dear *Mashe-Ferang*, you are alive and your spirit and wisdom have inspired me. I am now showing you that the fruit of your heart is committed to carrying on your message to the world, to the community, and to the fruits of the fruit of your heart."

I am sure there are a great many people like *Mashe-Ferang* throughout the world and throughout the history of humankind and yet seldom are they given sufficient credit for their wisdom, knowledge, and experience.

A Personal Reflection: Moving on....

I approach this study with a clear awareness of its relation to my own personal and professional development. I have experienced a number of major transformations in my life. First, in 1976, I left my home country, Iran, to study abroad in the United States. In 1982, on account of my love for nature, I changed my field of study from Microbiology to Agriculture. I returned back to my home country in 1988 from the United States. I wanted to simultaneously teach and learn about agricultural extension and education at the College of Agriculture at Ferdowsi University. I had the opportunity to practice and gain awareness as both an External (outsider) and an Internal (insider) agent[2] where Agricultural Education and Extension[3] was introduced internationally with an eye to adopting it or adapting it across various cultures. While working and studying there, I found that Agricultural Education and Extension utilized formal and non-formal education containing many concepts taught in International/Intercultural Education. I later learned about this specialization at the University of Alberta in Edmonton. I made the decision to once again leave my homeland to come to the University of Alberta's Department of Educational Policy Studies to work on a doctoral degree in Intercultural/International Education in September 1996. I found aspects of Intercultural/International Education to be intrinsically connected to my research interests.

With that in mind, I was inspired and empowered to look critically at agricultural education and extension programs back in Iran and in other countries. More specifically, I wanted to investigate the implementation of local knowledge into this whole idea of extension, and yet be able to incorporate my professional life experiences as an extension educator and as a researcher.

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[2] Please see Page 16 in Chapter two: Conceptual Framework

[3] Please see Page 16 in Chapter two: Conceptual Framework

Statement of the Problem and Research Focus

I see the need for a more holistic understanding and analysis of the political, social, cultural, environmental, historical, philosophical, and economic factors that influence our lives worldwide. These factors have had a very significant impact upon the life of Indigenous peoples[4]. Their lives have been affected by the expansion of agricultural education and extension programs under the auspices of agricultural development. I studied International/ Intercultural Education with the hope that I could learn enough about Indigenous knowledge to build a meaningful link between my former studies in Agricultural Extension and the field of education.

As discussed in detail in the conceptual framework (chapter 2), scholars and analysts have raised the issue of Indigenous knowledge and its contributions to activities for sustainable development. The editor of a special issue of *Indigenous Knowledge Development Monitor* (Dec. 1995) suggests that there is an urgent need to set up an agenda for research to understand the term "Indigenous knowledge" and its application. In keeping with this concept, the major focus of this thesis is to critically examine the theoretical and professional field of agricultural extension over the past ten years or so (1990 to 2003) to understand the role of Indigenous knowledge and experiences in the local, national, and global contexts of rural or agricultural development. To what degree does the theory and practice of agricultural education and extension in its present predominant paradigms and models, as well as emergent alternative perspectives, incorporate Indigenous knowledge?

More specifically, the study seeks to answer the following often-interrelated questions (see Chapter Five):

---

[4] Donall Purich (Goehring, 1993) points out that "In recent years, many Aboriginal people have argued that words like Aboriginal, Native, and Indigenous should be capitalized when referring to specific people, in the same manner that words such as European and American are capitalized." I agree; hence, the reader will note that such words in this study are capitalized.

- Where and how has Indigenous knowledge been considered and integrated into the theory and practice of agricultural extension?
- What differences may be discerned between programs demonstrating a concern for Indigenous knowledge and programs not reflecting such a concern?
- What lessons can agricultural education and extension specialists (change agents) learn from Indigenous knowledge to enhance the theory and practice of agricultural education and extension, especially in South contexts (southern countries or regions)?

The research problem will be described in detail in chapter 2, at which time background information to the study will also be provided.

Significance of the Study

Rethinking the philosophy of agricultural education and extension will help to develop more constructive programs that meet the needs of the people who are the intended beneficiaries, not the benefactors (financiers or sponsors) per se. Qualitative research needs to be undertaken to critically understand and evaluate agricultural education and extension programs whereby people's knowledge, experiences, and voices can be heard. The purpose of agricultural education and extension programs must surely be that of empowerment of their clienteles to function effectively and to predict and prevent the rise of all possible problems. To date, many extension programs and solutions have been offered only after the problems have already been raised and experienced. It is highly problematic to see that extension programs apparently have a lot more to offer to and for advantaged commercial growers than they have for helping disadvantaged small local growers.

We need to understand that historical and cultural knowledge can offer valuable information for the understanding of present circumstances. And we need to know that this understanding can be of assistance when reconstruction is undertaken. This is especially important for those most affected by agricultural development. By focusing on the role that Indigenous knowledge plays in enhancing agricultural extension, this study may help to reorient the theory and practice of extension away from prevailing technocratic paradigms and practices. In fact, care for Indigenous knowledge may enhance the involvement of local people, both Indigenous and non-indigenous, in recapturing their breath and animation in the "new world order." It is through such an approach that the contradiction between modern and traditional science can be minimized. Last but not least, this study will have significant implications for the design, curriculum and pedagogy of extension programs in formal institutions of agricultural education and training. It is to be hoped that professors and teachers of agricultural education and extension will be persuaded that the integration of Indigenous knowledge into the preparation of future extension agents will enhance their relevance to people-centred development.

Limitations and Delimitation of this Study

I could only benefit from literature written in English or Farsi. Therefore access to primary and secondary resources from nations speaking other languages was limited. This study is delimited to an analysis of existing documents. First-hand knowledge of Indigenous resources is excluded, apart from matters touched upon in my life stories.

Chapter 2: Conceptual Framework

Over the decades, the role of agricultural extension education and research has been acknowledged as central to the development of modern agricultural paradigms and systems worldwide. Based on a range of theoretical approaches and models articulated by scholars and researchers, extension agents have helped farmers apply new strategies and techniques, adopt agricultural innovations or technologies, and implement countless projects and programs in agricultural development. In many cases these agricultural extension education activities have been undertaken under the auspices of international aid and development agencies with the cooperation of national or regional governments. Not surprisingly, faculties of agricultural sciences in both North and South Universities and colleges usually have units or departments specializing in extension (Mumford, 1940). The research output in this sub-field of agricultural science has therefore been substantive and broad in terms of regional and national goals.

To date, the scholarly and professional literature on agricultural education and extension makes reference to a number of major strategies and models in theorizing and practicing extension. Agricultural extension systems have been associated with and implemented by Ministries of Agriculture, "land grant" universities, and related government or private organizations including non-governmental organizations (NGOs). Invariably, extension has been a key component of efforts in rural or agricultural development, including integrated rural development programs, rural animation, community-based farming programs, commodity development and vertically integrated production systems, local or village-based programs and participatory agricultural training programs (APO, 1993; FAO, 1989; Swanson, 1989; Farrington and Martin, 1987; Poostchi, 1986; Adams, 1982; Mosher, 1978; Benor and Harrison, 1977). Strategies of agricultural extension have been based on concepts or techniques such as diffusion multipliers, contact farmers, demonstration farmers, action orientation, multi-media, technological alternatives, rewarding jobs, as well as training and visit (T.V.)

systems.

As discussed in detail later, the dominant models and strategies of agricultural extension have been criticized for a number of limitations in their conceptualization and practices. For example, there is often a bias in social class in favour of the better-off farmers, resulting in the negligence of farmers at subsistence level by extension agents and strategies, which has been the case in the majority of African countries (Gill, 1987). This neglect of small-scale farmers "continues along with the neglect of women, the major participant in this sector" (Gill, 1994; Gill, 1987, p. 5). Local or community needs can also receive less attention in comparison to national and especially global priorities and goals (Compton, 1989; Warren, 1989). Also, technology transferred through extension is often incompatible with local conditions, cultures, and resources, while structural barriers (e.g. power inequalities) are often not taken into account (Willoughby, 1990; Adams, 1982).

More recently, a number of scholars and researchers have strongly argued for the need to be responsive to the role of "Indigenous knowledge." In their view, the dominant approaches to extension have tended to exclude or marginalize Indigenous knowledge, thereby overlooking the theoretical and practical insights or lessons for developing agriculture that is sustainable and meets the basic needs of all peoples. Although "Indigenous" is not yet a clearly defined term (Schneider, 1997), the concept "Indigenous knowledge" can refer to a part of the culture and traditional experiences of local peoples from the community to the national level.

In the agricultural sector, Indigenous knowledge includes the traditional farming practices of local and/or Indigenous peoples (Warren, 1991, 1990, and1989). According to Thrupp (Warren and Rajasekaran, 1993):

> Indigenous knowledge systems are adaptive skills of local people, usually derived from many years of experience that have often been communicated through "oral traditions" and learned through family members and generations. Local people,

> including farmers, landless labourers, women, rural artisans, and cattle rearers are the custodians of Indigenous knowledge systems. (p. 2)

Linden (1991) emphasizes that, "the memories of elders, healers, midwives, farmers, fishermen, and hunters in the estimated 15,000 cultures remaining on the earth is an enormous trove of wisdom" (p. 7) In line with this point of view, it will be maintained throughout this thesis that the specific groups, communities or nations of peoples referred to as *Natives, Indigenous*, *Aboriginal*, *First Nations* or *tribal* peoples constitute an important source of local or Indigenous knowledge, traditions, and experiences. However, the accumulated wisdom of local non-indigenous peoples in a society is also seen as valuable knowledge for the survival of future generations. In the evolution of agricultural extension theory and practices, such local and/or Indigenous knowledge has been seen as of little or no value or even as irrelevant to the goals and strategies of modern agricultural development. In contrast, the evidence presented by an emerging group of scholars suggests a need for agricultural scientists and policy-makers to look closely at the limitations of the dominant approaches based on the modernization paradigm of "development." This thesis, therefore, seeks to take on the challenge of articulating a systematic alternative framework for agricultural extension that meaningfully integrates Indigenous knowledge into agricultural extension theory and practice.

A History of Agriculture

It is important to know when, how, and why agriculture or farming emerged in human life. Historians have come to the conclusion that mankind, after an extended period of hunting and gathering, started settling down and gradually formed villages. The literature shows that the history of farming goes back about 9000 years and that it took a further three to six thousand years before settlements began to emerge in various conditions in different geographical locations of the world. Gradually, villages expanded to towns and cities, bringing about a distinction between people in rural and urban regions.

The nomads who once lived in the mountainous regions of the world made a practice of living in the foothills during the cold seasons and in higher altitudes during the warm seasons. The nomads of Asia stayed in southern valleys during the cold season and migrated to northern valleys during the warm seasons. This is a good indication that the Indigenous people of that time, like those of today, adapted themselves to the natural environment. Eventually these nomad peoples gradually started settling down by learning how to domesticate the animals and plants, how to build homes and shelters for themselves and their animals, and how to construct storage places for their food products. What they were doing was domesticating themselves in such a way as to get used to a new world suitable to their family and tribal life. They also learned to defend themselves against natural disasters, tribal attacks, or the oppression imposed upon them by an unjust ruler. Slowly but surely, agriculture became a means to an end for these settlers, the assumption being that their lives could be improved using the available natural resources liberally and consistently.

Historians have carried out many investigations of different societies and peoples, and of past social life over the course of the history of mankind. The history of mankind is not complete and ecologists, anthropologists, archaeologists, sociologists, and other scientists are just beginning to understand prehistoric times and peoples. The curiosities and endeavours of all these scholars have even paved the road for new scientific challenges focusing on DNA analysis of the remaining parts of prehistoric people, animals, and plants. Unfortunately, many of the research studies to this point have concentrated on food production and demographic movements. There are few completed case studies on the importance of the spread of agriculture, the gradual expansion of agricultural colonizers, and their broad consequences and implications. Yet, agriculture is the basis of civilization insofar as it ushered in a new world for mankind.

> Today the astonishing way in which this advance took place is becoming increasingly clear as archaeologists fine-comb the soil and sand of ancient agricultural sites. From the mud-walled ruins of farming villages that were far

> more advanced than anyone had even dreamed for so early a date, and from evidence as seemingly ephemeral as the husks of seeds and the bony cores of animal horns, the investigators have been able to piece together one of the greatest and most exciting episodes in human evolution, the birth of agriculture. (Leonard, 1973, p. 10)

Agriculture has driven mankind toward sacrificing his freedom of movement in his simple hunting and gathering collective life and to instead establish himself as a set of greedy individuals worried over the security of their farmland or backyard. Farmers face new needs, amenities, opportunities, and challenges using technological inventions to alter their relations with their own natural habitat from one of adapting to nature to adapting the natural environment to their own needs in major ways. Proceeding blindly in the face of adversity, agricultural workers have also been trying to alter the life of other living organisms in favour of their own self-interest desires without understanding the philosophy of equilibrium and the relationships in nature among and between all plants, animals, and micro-organisms. As described by Leonard (1973):

> With the rise of agriculture around the world, however, man had to deal increasingly with problems of sanitation, pollution, and communicable disease, and psychologically he withdrew from the natural world into the more subtle and threatening world of unseen social pressures. Within the expanding complexities of this new social universe, with all its jealousies and passions, he had to redefine his relations to his fellow men and to the unseen forces around him. (p. 7)

Agricultural evolution gradually led to the industrial revolution, and agricultural subsistence shifted to commercial food production industries. Today, every aspect of agricultural development narrows down to economic development (understood in dollar term). There are now numerous fields of studies such as Agricultural Economics, Rural Economy, Rural Development, and Machinery Management that have a root in Economic Development. It often seemed that nobody cared at what cost, to what extent, or in what form these programs brought development to societies or any particular group of people. The question that remains to be investigated is what these programs can bring to people in terms of character development, in regard to their ethics, morals, peace, understanding, or the preservation of values and traditions. It is only within the last couple of decades that some environmental concerns and movements started taking place under a new science called ecology. Not long ago, environmentalists coined another term, 'sustainable development,' to give a more holistic and constructive meaning to conservative farming and its other subdivisions. The list of terms is long and it is sufficient to mention that it is an attribute of the scientific world to come up with new terms when people are frustrated with old ones. And the new ones, we must hope, will make more sense and bring us better fortune.

The term sustainable development is a recently introduced concept in the study of agricultural development. The practice of sustainable development is not only quite vaguely defined but is also totally different from the original concept practiced by Indigenous people for thousands of years. On one hand, modern agricultural knowledge suggests the key to sustainability is diversity and on the other hand, it introduces the use of genetically modified seeds that is the killer of diversity. Traditional agricultural knowledge encourages the practice of growing Indigenous seeds to preserve their diverse wild varieties. The more we read through the history of mankind and discover more about the traditional societies and the knowledge and wisdom of Indigenous people all around the globe, the more we discover they have been incorporating such concepts as 'sustainability,' "diversity," and preservation of natural resources without tinkering so much with the nature of things. They have been practicing these concepts although they might have been using different local terminologies. In this case, the Indigenous practices are more meaningful, respectful, constructive, and sustainable, and yet the Indigenous people themselves make no claim of ownership of the actual concepts.

Agricultural Extension: History and Paradigms

"Of all the cultural innovations created by man, certainly one of the most profound in its effects has been the invention of agriculture." (Dayson, 1973, p. 6)

One of the most well-known and popular educational activities for agricultural training and development is the agricultural extension system. The name that is used may vary from country to country, but the actual system basically follows the same pattern all over the world. In about 1873, the idea of "extension education" took root in England (Mosher, 1978). The term "extension lecture" was used to refer to specific educational activities for people not able to receive a formal university education (Adams, 1982). Richard Moulton and his companions from the University of Cambridge were the first lecturers to travel throughout the countryside-teaching adults. It should be noted, though, that extension was/is not limited to agricultural issues. In fact, it began with a variety of teaching activities focusing on the needs of women to learn various domestic duties (e.g. food preservation methods). It is ironic, then that the knowledge of women is sometimes ignored or excluded, as will be noted in Chapter Five. The idea of extension lectures was later extended to the United States with a focus on agricultural extension. The establishment of land grant institutions in the United States of America through the Morril Act (1862) was a concrete foundation for building and strengthening three major divisions of agricultural extension, namely education, research, and extension (Mumford 1940). The passing of the Smith-Lever Act in 1914 to introduce a "non-formal education for the farming communities" further enhanced the agricultural extension movement (Adams, 1982; Kesley and Hearne, 1955). Mosher (1978) makes a distinction between extension in industrialized/North and developing/South countries. He points to, for example, the contrast between the situation faced by farmers in United States, where most farmers are within about seven miles of a town where a variety of modern resources are readily available to them, and the situation faced by most farmers in developing parts of the world.

Extension emphasizes learning by doing or the hands-on-experience type of learning in an informal training environment. However, it is the philosophy of extension to provide a suitable, healthy, and constructive learning environment where people of all walks of life can participate and interact with each other in all teaching-learning activities. As Bopp (1985) aptly argues, "human beings must be active participants in the unfolding of their own potentialities" (p. 14). According to the United States Bureau of Education of 1888, the Morril Act of 1862 is "the most important educational enactment in America" (Mumford, 1940, p. 7). The supporters of this movement struggled hard for more than thirty years to initiate and implement various agendas regarding the need for a broader education and many other related issues such as:

- The educational needs of farmers and their families as industrious productive individuals
- The kind of educational systems, contents, and approaches
- The appropriateness and practicality of training programs
- The location of agricultural schools
- The goals and objectives of training programs
- The definition of new terms
- The adaptation to new changes in moving from traditional to more modern or liberal forms of education
- The required expenditures
- The economic impacts regarding the price of lands and the development of the country in general
- The social impacts resulting from the migration of farmers and their children
- The need to plan for and create various employment opportunities related to local or rural needs
- The technological adaptation and shift from small local farming to larger-scale cooperative and/or commercial production.

The land grant colleges led a profound movement to establish a series of agricultural schools and universities in different states. The philosophy of extension as embodied in the Morril Act of 1862 and 1890 required that in every land grant agricultural college the "student should perform manual labour in connection with their studies of the theory of agriculture" (Mumford, 1940, p. 9). Mumford (1940) states that the land grant movement was patterned after the British Board of Agriculture, established in 1793 by an act of the British Parliament. United States policy makers saw the need to gather, publish, and disseminate information on agricultural topics. These agricultural schools in turn promoted the development of many new ideas (e.g., field studies on agricultural machinery management and farm safety) as well as various agricultural training programs, research plans, publications, and even agricultural commodities such as fertilizers and hybrid seeds. They also provided various opportunities for activists and interested people to form and direct the corresponding agricultural institutions, organizations, scientific societies, and agricultural research centres or experiment stations.

It has been said that these land grant colleges came into being "as the result of a deep-seated and urgent demand of the common people, particularly farmers.... the passage of the bill came primarily from the farmers and those interested in the conservation and intelligent utilization of our land resources" (Mumford, 1940, p.10). As Thompson stressed, "this new educational reform sprang not from the educational philosophers or the professional teachers, but from the rank and file of the people themselves" (cited in Mumford, 1940, p.10). These statements remind us of the important notion of who the inventors of the idea of agricultural extension education were and, therefore, who should be the target of agricultural extension services as well.

Extension Strategies and Models in the South

Staatz and Eicher (1988) describe when, how, and why agricultural extension was transferred to other countries from the United States. In 1950, with the post-war expansion of agricultural development programs, heavy emphasis was given to the rapid and direct transfer of agricultural technology to developing nations (also referred to as the South or Third World) from industrial (North or Western) countries (Schultz, 1964). This transfer of technology took place alongside the promotion of the American model of agricultural extension (Staatz and Eicher, 1988; Rogers, 1983).

Many well-known extension models have already been established in the South or developing countries (Axinn, 1988 and 1987). Sometimes different names are used, but the principles remain the same (APO, 1993; FAO, 1989; Niehoff, 1966). While the majority of the existing models have been developed and implemented in the South by experts from the North, some extension agents from the South have also modified or adapted these programs to the circumstances of their country and people. A glance through the history of the theory and practice of extension models shows at least four overlapping paradigms that parallel the larger paradigms of "development" in which agricultural or rural development is situated. As Agrawal (1995a) noted,

> In the decades since the Second World War, the rhetoric of development has gone through several stages--from its focus on economic growth, to growth with equity, to basic needs, and to participatory development and sustainable development. (p. 3)

First, extension models were created with a focus on farmers and their families to help them in their local crop production with the formation of local cooperatives to support local producers. Second, extension encouraged and trained farmers in the use of agricultural technologies such as additional machinery, improved seeds, and a variety of chemical sprays in order to prepare them for commercial production strategies. A third paradigm shift began in the 60s when more attention was given to rural places and to those disadvantaged farmers who were left behind during the era of the rapid commercialization of agricultural enterprises (Adams, 1982). In their report to the World Bank, Coombs and Ahmed (1974) explained that, in the opinion of development experts in the late 1960s, "greater emphasis should henceforth be given to developing the rural areas of poor nations. And, this would require, among other things, fresh approaches to meeting the educational needs of rural populations" (p. 16). One well-known exemplar of this focus on disadvantaged rural farmers is the Comilla project in Bangladesh. Funded by the Ford Foundation under the direction of Michigan State University in 1959, the project was established as the Comilla Academy for Rural Development in East Pakistan. This project adopted a multi-disciplinary approach to rural development. One task of Comilla was to find a formula for facilitating productive and effective cooperative work, with the hope that problems of rural credit could be solved by setting up such cooperatives (Khan, 1974; Safdar, 1972; Sanders, 1966).

A fourth paradigm shift in extension philosophy and practice has become more visible as a growing group of critical analysts points to various limitations in the dominant models of extension within a modernization paradigm of development. In practice, many extension programs have failed to meet the diverse needs of communities in many developing countries. Adams (1982) articulates the following problems in the extension programs of developing countries:

- Inadequate understanding of the special problems involved in bringing about social and economic change rural societies;
- Poor levels or scope of extension organizations and management (e.g. the ratio of extension workers to farmers in most South countries is 1: 5000 farm families compared to 1: 350-1000 in North regions). Also, extension agents are often torn between loyalty to farmers and loyalty to their employers;
- Inappropriate importing of technology and resources in conjunction with lack of knowledge about local resources;
- Lack of understanding of local knowledge and experiences and poor or impractical extension training for extension agents and local farmers as well. Training often facilitates extension agents and young farmers in particular to "escape" from rural localities;
- Lack of proper supporting services for South countries with 50 to 80 per cent of the people reliant on agricultural employment and with high ratios of illiteracy and poverty.

Furthermore, the failure of many agricultural extension and related community development programs to achieve a rapid increase in agricultural output can be traced to the modernization paradigm's neglect of structural barriers in rural development, notably highly concentrated political power, ownership of or access to resources (e.g. land, inputs), and the incompatibility of technology packages with local needs, languages and conventional practices (Shiva, 1997a; Willoughby, 1990; Wilson, 1983; Jiggins and Roling, 1982; Kaup, 1977; Jequier, 1976; Schumacher, 1973; Schultz, 1964).

Key assumptions underpinning the fourth paradigm of extension theory and practice are hence the need to address the root problem of structural violence or social injustices and the need to acknowledge the value of the people's knowledge and experiences based on their traditional farming practices and local contexts. As critical development analysts like Korten (1990) and Clark (1991) have argued, modernization strategies have often further marginalized the poor by "integrating" them into unequal economic structures and relationships. In contrast, local urban and rural elites, as well as external agencies (e.g., transnational corporations, and international financial institutions), benefit disproportionately from modern economic growth. Moreover, the current emphasis on globalization (e.g., NAFTA, APEC, WTO, MAI) will only aggravate the gaps between rich and poor both between and within nations. One particular sector that has also been significantly marginalized by decades of modernization is that of women in the South or developing countries (Gill, 1994 and 1987), a problem that has been recognized in the "women in development" (WID), "women and development" (WAD), and "gender and development" (GAD) literature and advocacy (Rathgeber, 1994; Moser, 1991). Numerous studies in Asia, Africa, and Latin America have shown that extension programs are designed in such a way that female farmers, in comparison to male farmers, have little or no access to farming information or resources (Hinrichsen and Marshall, 1991; Moser, 1991; Herz, 1989; Warren, 1989; Compton, 1989; Gill, 1987; Adams, 1982), even though women's contribution to agricultural production has been estimated at 30 and 70 percent of the total.

One example of a more participatory and equity-oriented strategy of agricultural extension is the Strategic Extension Campaign (SEC), which was first developed by FAO and has been applied in Africa, Asia, and Latin America. Its emphasis is on poor and disadvantaged farmers who live at the subsistence level. The definition of FAO (1994) for SEC is

> needs-based, demand-driven, and has a participatory-oriented method for planning and problem-solving. It also relies on "farmers' Knowledge, Attitude, and Practice" (KAP). It is an interactive, systematic, and holistic model. (p. 5)

A key principle of SEC is that extension policies should not bank on agricultural studies to supply and accumulate new technology packages (FAO, 1990). Yet, many KAP surveys from developing nations show that a large number of traditional technologies or cultural practices are neither well understood nor practiced by most researchers and small farmers.

In the emergent fourth paradigm of agricultural extension, the role of extension specialists, technicians, and extension agents as facilitators, mentors, or educators is reaffirmed as vital. Going beyond providing a mere transfer of knowledge, these people act as change agents who have to work sensitively and constructively with people's attitude and behaviour. They should not only assist people to develop a self-reliant capacity to work with and help one another, but should also provide an atmosphere in which the learners become active participants mentally and physically in all processes of change.

In practice, however, evidence has accumulated worldwide to show the limitations of modern extension theories and practices; extension agents have often failed to gain enough understanding of the knowledge, culture, experiences, and potentials of the people they are dealing with. Critical analysis has demonstrated that extension agents, under the influence of top administrators, often eventually shift from meeting the real needs of the people to achieving congruence with the administration and other institutions (Compton, 1989; Warren, 1989; Adam, 1982). Consequently, they may pay relatively little attention to objectives relevant to local or community levels, which then tend to be neglected in national or global planning. Additionally, extension agents often serve as the primary thrust of the modernizing paradigm to shift farmers from small-scale production to modern, large-scale, technological, commercialized and increasingly globalized orientation and strategies. In addition, Roling (1989) points out that in most South countries, extension organizations and many other related agencies have often directed their attention to the "better-off farmers," who make up only 20 percent of all farmers worldwide. He also states that

> The objective is often not so much the welfare of the farmers as it is the creation of a surplus for national development, which has often been equated with urban elite development. In the short run, such a policy is much easier to implement with a few larger farmers than with thousands of small ones. (p. 8)

A report from FAO (1990) shows that the commercial farmers are the ones who benefit the most from extension resources worldwide (about 58 percent) while the small, resource-poor farmers only benefit from 22 percent of the extension resources (Swanson, 1990; Franklin, 1988).

A browse through (or survey of) agricultural extension systems throughout the world shows how they have influenced the life of subsistence farmers for better, and for worse. Every agricultural extension system is interdependent with other facets of agricultural development and the corresponding program planning of public and private organizations and agencies. However, the success of agricultural extension systems relies on government policy and its commitment to provide economic supports for program planning and resource allocations. If a government does not have a supporting policy for its local and small producers, then the agricultural extension system that is implemented operates, based on its main policy, in support of big producers at the cost of bringing small farming to an end. To make matters worse, as many case studies show, the expansion of agricultural extension in the South countries under the auspices of agricultural development has alienated the farmers from their sustainable traditional and local farming knowledge and practices. The same holds true, according to numerous studies, in Western countries implementing agricultural extension for their agricultural development programs.

Agricultural extension in Iran is not an exception to this worldwide mainstream extension model. When I returned to Iran in 1988 to teach and research in the field of extension, what I observed first in the capital city of Tehran was the Agricultural Ministry Building, known among the Iranian people, and among farmers as well, as the Kingdom or the Castle of the Agricultural Ministry. It was not easy even for an agricultural lecturer to get information from this agency or to visit one of the designated authorities in this huge building or one of its branches in the provinces or the big cities of Iran.

Agricultural extension systems are varied, with multiple approaches and models around the world. But one general understanding about them, and a point frequently criticized, is that they have often taken a position of one-way delivery of information to the people or farmers. Agricultural organizations have rarely accredited the knowledge and experiences of local people as something to be integrated into agricultural extension and education for program planning, policy or decision-making, or into their research design and practices. It is often said that agricultural systems are interdependent, requiring improved linkages of many educational and research agencies and organizations for their agricultural development processes. But this interdependence has never meant much when it comes to acknowledging the importance of the existing knowledge and experiences of the local people. The very success of agricultural extension has always been determined by certain supports, in particular economic supports, as expressed through policy, planning, and resource allocations. But the socio-cultural and political aspects and the involvement of people and their knowledge and experiences have seldom been valued much in comparison to all the other external factors. Consider, for example, the injection of inappropriate technology into many South countries under government policies of agricultural development using an agricultural extension model with inadequate vision of its consequences such as debt, alienation, dependency, deprivation of land, depredation of community living style, and family disintegration (Suzuki, 1989; Shiva, 1989). Suzuki (1997) states, "Despite the enormous benefits of any technology, our knowledge about how the world works is so limited that we can seldom predict all consequences of that technology for the world around us" (p. 18).

In sum, now that the theory and practice of agricultural extension has witnessed the rise of new paradigms to challenge existing assumptions and strategies, it is important to undertake research into emergent perspectives that claim to be more responsive to the needs and rights of the majority of the poor people in South regions. In this regard, a significant number of analyses and studies have demonstrated that extension under a modernization paradigm of development has further marginalized poor majorities, and it is partly for this reason that more attention is now being turned to the role of Indigenous knowledge and the experiences of local peoples, whether Aboriginal/Indigenous/Tribal/ First Nations or non-indigenous mainstream farmers.

Indigenous Knowledge

Aware that Indigenous knowledge is not limited only to people defined as Indigenous, the United Nations Economic and Social Council, Commission on Human Rights (1982), has made an effort to define Indigenous people as follows:

> The Indigenous population is composed of the existing descendants of the peoples who inhabited the present territory of a country wholly or partially at the time when persons of a different culture or ethnic origin arrived there from other parts of the world, overcame them and, by conquest, settlement or other means, reduced them to a non-dominant or colonial situation; economic and cultural customs and traditions with the institutions of the country of which they now form a part, under a state structure that incorporates mainly the national, social and cultural characteristics of other segments of population that are predominant. (p. 2)

The World Bank's (1991) annual report on World Data and Statistics shows there are about 270,000,000 Indigenous people worldwide. The largest portion of this population, about 80 percent of all Indigenous people, is in Asia. Goehring (1993) states that this definition "serves to identify pre-existing societies that have been overrun by global capitalism, and who have previously had a long identification with a land they considered their source of life and their birthright" (p. 6).

The conflicts between First Nations people[5] and colonizers over the course of the history of humankind are well known. Dayson (1973) notes how dislocating plants and animals, displacing water and soil, and dislodging trees has disturbed the balance of nature:

> The expansion of agricultural colonizers was not without cost. Game was driven off, killed, or forests and grasslands were slashed and burned, plowed [ploughed] up or overgrazed. The bands of hunters and gatherers were perished. The problems of sanitation, pollution, communicable disease, and unnatural social pressures were increased. (p. 15)

Less well known, however, are the struggles of First Nation peoples regarding their rights and the preservation of their knowledge and experiences (Oluput, 1994; Allen and Thomas, 1992; Bernstein, Hewitt, and Thomas 1992; Johnson, Bernstein, and Thomas, 1992; Pearson, 1992).

In *Science for the West, Myth for the Rest*, Scott (1996) explains that traditional knowledge has been viewed as myth by contemporary Western scientists and that this has ultimately contributed to an "undermining of the Indigenous societies and cultures as producing an 'inferior,' 'irrational,' 'simplistic,' and 'static knowledge'" (Warren, 1989; Compton, 1989). Likewise, the Indian scientist and critical analyst Vandana Shiva (1997b) has questioned the 'monopoly' of North/Western knowledge systems and paradigms on many aspects of agricultural development. After asking why the "Western systems of knowledge are scientific while non-Western traditional systems are not," Shiva (1997b) calls for "the adoption of a pluralistic view of knowledge systems which would respect different systems of knowledge, each with its own logic and epistemological foundation" (p. 34). Rajasekaran (1993) defines Indigenous knowledge as "the systematic body of knowledge acquired by local people through the accumulation of experience, informal experiments, and intimate understanding of the environment in a given culture" (p. 3). In a parallel way, Kroma (1995) gives the following operational definition of Indigenous knowledge:

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[5] First Nations People can also be termed as Indigenous, Aboriginal, or Native people.

> Indigenous knowledge is a local knowledge, derived from interactions between people and their environment, which is characteristic of all cultures. It spans the entire range of human experience, including history, linguistics, politics, art, economics, administration, and psychology. Its technical aspects include agriculture, medicine, natural resources management, engineering, and fishing. (p. 5)

Indigenous knowledge in many traditional societies has served as the backbone both for decision-making and the content of education. Abundant evidence based on human activities in various societies has pointed to the broad utilization of such complex traditional knowledge (Warren, 1992; Atte, 1992). Kroma emphasizes, "exclusion of such knowledge from development activities has had disastrous consequences in every region of the world where outsider knowledge has been imposed without regard to local knowledge" (p. 4). Drawing on research studies especially in Africa, Clark (1991) shows how ignoring local knowledge has contributed to the failure of some modernization programs or projects in rural development.

In response to such criticisms, some rural development scholars and researchers have sought to integrate the strengths of "Indigenous" or "traditional" knowledge with "modern" knowledge. For example, Gerald Marten has argued that

> Neither modern Western agriculture nor Indigenous traditional, in their present forms, are exactly what most small-scale farmers will need. The challenge for agricultural research is to improve agriculture in ways that retain the strengths of traditional agriculture while meeting the needs of changing time. (cited in Wolf, 1986, p. 34).

Hardwood (1990) suggests that combining traditional and modern technologies is a key to adapting disadvantaged farmers to modern practices. McClung notes that, "researchers must be unusually adept at seeing the world from the farmers' vantage point" (cited in the foreword to Hardwood, 1990). For example, the International Rice Research Institute has encouraged some of its scientists to make a thorough appraisal of the knowledge and resources to be found in traditional farming systems. Hardwood (1990) has mentioned that

> In 1972, they [scientists] began to document some of this centuries-old knowledge and to measure the efficiency of resources used in these traditional systems. The result of these investigations has been a greatly increased respect for the traditional farmer and a new effort to combine traditional farming knowledge and skills with the trained insights and experimental method of the scientific researcher. (p. 8)

Another example is the case of Genaro Herrera, a little village in the Amazon. The Peruvian government has established a research centre there that has built up *"hacras"* or traditional Indian farming plots (Weatherford, 1988, p. 80). This is where agronomists, botanists, and foresters learn from local Indians about traditional crops (for instance, about different Indigenous varieties of yams, potatoes or other tubers), Indigenous farming methods, and other traditional techniques for building and storage (using the resources and materials that are locally available).

It would be a great challenge for traditional agriculture alone to solve the problem of food production in today's world, and it may well be, as these examples illustrate, that some appropriate integration of Indigenous and modern knowledge is essential (Rodale, 1983). Under the current realities, however, modern agriculture has not only not solved the food problem but has also contributed to major problems such as environmental devastation, social inequalities, excessive control by external agencies, and cultural destruction (Suzuki, 1996; Allen and Thomas, 1992; Sklair, 1991; Jackson, 1990; Trainer, 1990a, 1990b and1989; Hardwood, 1990; George, 1987).

Oral Traditions and Knowledge

To elaborate on the importance of oral traditions, it is vitally necessary to discuss such influential elements as language, culture, and history. bell hooks (1994) describes how language not only reflects the culture from which we emerge, but also embodies the unique and distinctive aspects of who we are. If we deny these things, we become estranged and alienated from our past (Samovar and Porter, 1995). We normally use language to communicate in two formats, written and oral. Americans have predominantly adopted the use of the written format in their communication, whereas Indigenous people have a very strong oral tradition of story telling with an emphasis on stylish delivery (Native Oral Tradition)[6]. Samovar and Porter (1995) also note that:

> The dominant American culture has long emphasized visual learning through the written word. In this empirical approach knowledge is obtained by observation: seeing is believing. This tradition posits that the highest levels of thinking can only occur by reflecting on thoughts recorded on the page, which leaves little room for an oral learning tradition as it exists among African American, Latino, and [many Indigenous people and communities of different nations]. The dominant culture generally seeks meaning in the words themselves and [Indigenous] culture uses words frequently as power devices, and delivery style becomes as important as the words themselves. (p. 24)

In the oral tradition of Indigenous people, a multi-dimensional use and understanding of words is encouraged, whereas in the written tradition of non-indigenous people, a two-dimensional textual format is recommended. To Indigenous people, the meaning is not so much in the words themselves as in people's minds, thoughts, or ways of knowing. The oral tradition delivers itself with feelings, emotions, passions, and facial expressions. An Old Persian proverb says that when the words come from the heart, they will reach the heart of another. One example of the difference between multi-dimensional oral knowledge and two-dimensional written knowledge comes into play when we try to write down a dream. The dream moves from a sacred multi-dimensional spiritual world through our brain into our hand, to the pen, and finally settles down on a two-dimensional medium such as paper. Our dreams and thoughts lose some of their dimensions and true meanings and even their sacredness when they are personified by our words and limited

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[6] This information is obtained from the following Web Site Address:

http://www2.tcu.edu/depts/prs/amwest/pdf/wl0011.pdf by space and time. No wonder, some writers use drawings, pictures or metaphors to broaden their horizons as well as those of their readers. Sometimes, a picture speaks more than a thousand words. The artefacts, remaining symbols, and drawing from ancient civilizations demonstrate beyond all questions that history and culture are not solely transferred through written texts.

The Importance of History and Culture in Knowledge

We have all often heard or read, at one time or another, that "History is the greatest teacher of all." There is also a famous saying commonly emphasized by the elders in Indigenous communities: "we are what we were." This is a very meaningful proverb. It simply reminds us to value the past, present, and future and how we are interconnected through time and at all times. We are the product of the past and what we do now matters the most since we are the makers of the future. We can learn valuable lessons from history even as we are making history from which future generations can learn valuable lessons. This reminds us about the most fundamental philosophy of life and our important responsibilities. It is important to create a better historical continuum so that in the future no one will have to look back in regret. Culture, too, as an invisible knowledge, is "itself a historical concept" (Freilich, 1972, p. 12).

Baviskar (1995 and 1992) has given a very interesting perspective on the interpretation of rural development efforts of the United Kingdom. He notes that it is strange how human beings learn so little from one another's experience. He believes that there is no reason why advanced industrialized countries should not learn a thing or two from the Third World countries, given their vast experience in the field of rural development. This statement is also very true when it comes to how little we learn from our own mistakes or each other's mistakes. Many Third World countries are repeating the mistakes that industrialized countries made in the process of development. That is, they are following in the footsteps of the industrial countries because they feel so far behind in technological development. The best tangible evidence to verify the above theory are the innumerable instances in which you find an individual, group of individuals, or even a whole society or country making a great effort to change everything they have or everything they are - to become just like the Americans so as to be seen as westernized or modernized. This is a common syndrome usually termed as alienation, meaning accepting a set of new standards at the price of losing your own values but without any acknowledgement or deep understanding of the consequences. The world is changing rapidly and so are our values and traditions. It is fair to say that we need to be balanced in all aspects of our life and obligations. If we accept the fact that the world economy is in the process of trading a great many goods, then why not accept the fact we can exchange or trade values as well? Many countries in the Southern or the Eastern part of the world have already begun to emerge as the largest consumers of the goods sold by the Northern or Western countries but at the price of losing their own sovereignty, cultural and traditional values, ethics, and morals. There is no reason why the advanced industrialized countries should not learn a thing or two from the Third World countries with their vast experience in such fields as philosophy, history, medicine, culture, ethics, morals, poetry, literature, cosmology, myths, and values. We need to slow down in our technological advancements and tinkering with nature to do a bit more exploring of our very own nature (Suzuki, 1997).

On one hand, we have traditional knowledge and on the other, we have scientific knowledge and we need to make the best of them to map out the way of the future. Over fifteen years of experiences of learning, teaching, and doing research in the field of agricultural education and extension at the local and international levels have inspired me to critically rethink the relationship between scientific and traditional knowledge. The data collected from my lived experiences in conjunction with studying the relevant research and teaching documents, have allowed me to analyze the relationship between scientific and traditional knowledge and how I have been perceiving them throughout my family, social, academic, and professional life. My efforts to consider, understand, and weigh up this relationship fall within the following explorations:

- To discover the reasons for the gap between the differing approaches of scientific knowledge and traditional knowledge;
- To discover possible ways of establishing practical relationships between the two approaches and to determine the types of contributors involved in the processes of agricultural education and extension;
- To discover the real benefactors and beneficiaries among the two groups of people involved, the outsiders and the local people

Searching for and finding the existing barriers and conflicts between scientific and traditional (knowledge) approaches is not an easy task. And it is even more difficult to find the possible ways of bringing them together as one continuum for improving agricultural extension systems and constructing a balanced model from which everyone involved will benefit justly. However, no matter to which type of knowledge we give more weight we need to know that:

"The Greatest enemy of knowledge is not ignorance, it is the illusion of knowledge."

Stephen Hawking

Chapter 3: Methodology

This research draws on qualitative methodology because it focuses on people's knowledge, experiences, traditions, and languages, all of which are too complicated to be measured quantitatively. Strauss and Corbin (1990) emphasize that some studies – such as those that seek to understand the interaction between people's knowledge and experiences with certain phenomena such as learning, adaptation, and acceptance or satisfaction – naturally require qualitative types of research. They continue, "qualitative methods could be used to uncover and understand what lies behind any phenomenon about which little is yet known" (p. 19). Jackson (1995) views qualitative research as an interpretive technique aiming to uncover the truth about people's knowledge and experiences in the social world. In the *Handbook of Qualitative Research*, Denzin and Lincoln (1994) suggest that qualitative research designs assist the researcher in:

> Looking at relationships within a system or culture, understanding a given social setting where demands that the researcher stay in the setting over time to determine and develop a model of what occurred in the social setting…. incorporating room for description of the role of the researcher as well as description of the researcher's own biases and ideological preference, involving an ongoing analyses of the data…. (p. 212)

Likewise, this study intends to examine the philosophical and ideological aspects of agricultural extension with respect to its sensitivity toward Indigenous knowledge and the lived experiences of Indigenous peoples. Within a qualitative framework, three research methods were used for collecting the data, presenting it, and finally analyzing the information. Denzin and Lincoln (1994), who refer to this three-pronged approach as triangulation, explain why a multi-faceted approach is necessary:

> Because different "lenses" or perspectives result from the use of different methods, often more than one method may be used within a project so the researcher can gain a more holistic view of the setting. Two or more qualitative methods may be used sequentially or simultaneously…. (p. 224)

The two primary methods used in this research were, first, document/content analysis, and, second, my own narrative/lived experience. These two methods were then backed by a third method, a discourse analysis in which I attempted to understand the implications of my findings in terms of improving the lives of people in marginalized rural sectors. In chapter four, the data presentation and interpretation are presented jointly.

Document/Content Analysis

In dealing with documents, researchers tend to choose content analysis so as to develop a coherent means of data collection. Researchers such as Berg (1989) and Weber (1985) have recommended establishing some meaningful key concepts that are pertinent to the ideology, values, philosophy, and culture systems of the study. Markoff, Gilbert, and Weitman (1975) emphasize the use of content analysis when a study encompasses ideology or other phenomena that cannot be measured quantitatively:

> What seems to have been important is a myth, a set of expectations, an ideology - in short, subjective definitions of the situation. If we regard such elements of social systems as impossible to measure, then the variables that alone are of importance in the light of recent research are to remain outside empirical study! The only way we know of measuring subjective dispositions over time is through a study of written records in which we believe them to be reflected, and any technique for rigorously and systematically summarizing such written records is a technique of content analysis. (p. 63)

Babbie (1995) states that content analysis is “a social research method appropriate for studying human communications and other aspects of social behaviour” (p. 307). Nam (1994) states “content analysis [is] a method by which to read meaning from communication text, mostly in written language” (p. 26). It would be misleading to claim that all meanings are articulated solely from textual documents. The meaning of the words was viewed as something in people’s minds that could change over time. One of my most important tasks was to explore, understand, build, and relate the existing, new and hidden meanings in the data obtained from both written texts and my lived experiences. A quantitative style of content analysis by, for instance counting the frequency of words was not appropriate because this method simply was not sensitive enough to explore the interrelationship between meanings and the way meanings change over time (Nam, 1994).

My search into documents then took me to texts in which I looked for the beliefs, values, ideology, philosophy, history, and culture embedded in the Agricultural Education and Extension literature to see just how Indigenous knowledge either did or did not impact the writing and teachings given there. The relevant data were abstracted from the statements or text and examined for patterns.

I kept the research questions in mind throughout the space and time of my readings (Edson, 1989), and a comprehensive analysis evolved as the complexities involved in tracing the changing ideological messages in the evolution of agricultural extension became evident (Nam, 1994, Babbie, 1983). Nam (1994) mentions "Qualitative content analysis attempts to understand the multiple interrelationships among dimensions that emerge from the data without making prior assumptions or hypotheses" (p. 28). The aim of my study was not verification of a predetermined idea, but rather discovery that might lead to new insights (Sherman and Webb, 1989).

I considered a range of documents published over the ten-year period from 1992 to 2002 preceding this thesis. I considered both theoretical and empirical perspectives, as well as research in professional journals focusing on the field of agricultural or rural extension as related to Indigenous people and their knowledge and experiences. I chose relevant journal articles, conference proceedings, book chapters, and case studies. Documents from the following sources formed the core of my study:

- Journal of Extension (JOE)
- Indigenous Knowledge Monitor (IKM)
- Journal of the National Association of Colleges and Teachers of Agriculture (NACTA)

A more comprehensive list of other organizations and the corresponding publications utilized for data collection and analysis is provided in Appendix B and the Reference section. Appendix A contains a list of commonly used abbreviations for these and other organizations referred to in this study.

Narrative/Lived Experience

Even as I was carrying out the document/content analysis, I began to realize the importance of my own lived experience and the impact that it has had on the meaning of traditional (Indigenous) in contrast to scientific knowledge and the need for the inclusion of materials of this kind in the agricultural education and extension literature. I also began to understand that meanings and understandings I accumulated changed through my lived experiences (or my life stories within their historical and cultural contexts). I realized that I needed to include the data from my lived experiences as a discourse of my perspectives in order to further illuminate the data from the document analysis. In this way I was able to create a meaningful connection by structuring the integration of theoretical knowledge with lived experience.

Golden (1990) describes how sometimes people use narrative as a 'technology of the self' to construct a moral agent out of themselves. It was for this reason that Focault's question as to "what are the means by which we can change ourselves in order to become an ethical subject?" (Focault, 1988, p. 17) started taking root in me. I believe that the inclusion of life history narrative brought life into my research study. It exposed my passion for learning, teaching, and researching in the field of agricultural education and extension. My experiences permitted and inspired me, as Bogdan and Taylor (1975) put it, "to explore concepts whose essence is lost in other research approaches. Such a concept as beauty, pain, faith, suffering, frustration, hope, and love can be studied as they are defined and experienced by real people in their everyday lives" (p. 12).

Calling upon my own lived experiences helped me to revisit my past and rethink my present to build my future, for, as Birren and Feldman (1997) suggest, "When you are interested in knowing where to go from here, you have to know where you've been" (p. 7). A Hebrew-based word, *Kavvanah*, which means the "spirit behind the intention that lifts everyday acts to higher realms," literally urges us to "take aim" (Birren and Feldman, 1997, p. 8). Telling your life story helps you to find new meanings and has many advantages, as Birren and Feldman (1997) aptly note:

> Your life story has a power all its own. Once you document your life and realize all that you have been through, survived, and accomplished, you can't help but have a fresh view of your worth. When you're armed with a sense of worth, you're armed with the power of self-respect. If your life feels empty and meaningless, there's also power in knowing what's missing. An examined life unlocks enough emotional armour so that an uncommon freedom of expression and intellect can flourish, and so that you can get out of your own way. (p. 21)

The nature and importance of lived experience is further described by Van Manen (2001) as it can be transformed:

> … into textual expression of its essence – in such a way that the effect of the text is at once a reflexive re-living and a reflective appropriation of something meaningful: a notion by which a reader is powerfully animated in his or her own lived experience. (p. 36)

According to Dilthey (1985), the subjective human studies (including law, culture, language, religion, art, and history) should concentrate on a "human-social-historical reality – [where our] lived experience involves our immediate, pre-reflective consciousness of life: a reflexive or self-given awareness which is, as awareness, unaware of itself." (cited in Van Manen, 2001, p. 35)

> A lived experience does not confront me as something perceived or represented; it is not given to me, but the reality of lived experience is there-for-me because I have a reflexive awareness of it, because I posses it immediately as belonging to me in some sense. Only in thought does it become objective. (cited in Van Manen, 2001, p. 35; Dilthey, 1985, p. 223)

For Dilthey, the life experiences and responsibilities are the "central idea or dominant theme" (cited in Van Manen, 2001, p. 36). He uses a series of elegant analogies to describe the importance of lived experiences and responsibilities: "Lived experiences [responsibilities] are related to each other like motifs in the andante of a symphony" (Dilthey, 1985, p. 227); "lived experience [responsibilities] is to the soul what breath is to the body and it is the breathing of meaning – is the constant heaving between the inner and the outer" (Dilthey, 1985, p. 59).

Wilhelm, Dilthey (1833-1911), German philosopher of history and culture held that the study of the human sciences involves the interaction of personal experience; the reflective understanding of experience; and an expression of the spirit in gesture, words, and art. Dilthey argued that all learning must be seen in the light of history; without this perspective, knowledge and understanding can be only partial.[7]

Merging Discourse Analysis with a Narrative Approach

Although this study is primarily based on a series of critical document/content analyses combined with relevant life experiences, I have also incorporated a discourse analysis approach to analyzing the data.

In support of a narrative approach, Agar (1980) cautions that discourse analysis is possible but "the problem increases when it is noted that any two traditions relevant to the task almost always partially overlap while remaining partially distinct" (p. 18). This seems to be the case when it comes to "Scientific" and "Traditional" knowledge, with the scientific established in the predominant role, without giving due recognition to the traditional in providing a keystone (bedrock). Agar (1980) further points out that "an exploration into the integration of different theoretical concerns [must be made] by careful attention to [the] richness of a person's account of human life in a natural context" (p. 16). Throughout this endeavour, I have been guided by Agar's words.

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[7] This information is obtained from the following Web Site: http://phenomenologyonline.com/scholars.cfm?range=57

During my social and academic life, discourse analysis has enhanced my understanding of the language used in texts and oral traditions in the West and the East. According to the *Dictionary of Social Science*, discourse refers to a domain of language use (ways of thinking, talking, and writing) that is unified by common assumptions that change over time (e.g. a discourse of modernity/tradition). From Foucault's point of view, discourse embodies meanings and relationships and embraces both subjective and power relations. Filax (2001) points out that discourses in a given period may overlap and reinforce one another, or they may contradict/conflict with each other (i.e. discourse of equality).[8]

Discourse analysis does not merely deal with language and talk in an abstract way. It goes beyond that to deal with the actions, responsibilities and commitments that result from talk. Wood and Kroger (2000) in their book *Doing Discourse Analysis: Methods for Studying Action in Talk and Text* explained:

> Language is taken to be not simply a tool for description and a medium of communication, but as social practice, as a way of doing things. It is a central and constitutive feature of social life. Talk creates the social world in a continuous, ongoing way; it does not simply reflect what is assumed to be already there. (p. 4)

Language that is used in the form of talk, or speech, or that is presented in writing is in fact a way of calling for certain action(s). As many discourse theorists have pointed out, this has always been the case in the world in which we live. As Sampson (1993) notes, "talk is constitutive of realities within which we live, rather than expressive of an earlier, discourse-independent reality" (cited in Wood and Kroger, 2000, p. 4). Potter and Wetherell (1987) emphasize that this view of discourse entails at least three major shifts from conventional orientations:

> (a) From a distinction between talk (discourse) and action to an emphasis on talk as action: (b) from a view of talk (discourse) as a route to internal or external events or entities to an emphasis on talk as the event of interest, and (c) from a

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[8] Cited in Gloria Filax's (2001) lecture notes for the course: Sociology of the Youth. Department of Sociology, University of Alberta.

> view of variability as an anomalous feature of action to an appreciation of variability both within and between people. (cited in Wood and Kroger, 2000, p. 4)

Philp (1998) describes how talk is indeed a form of action:

> Consider the headline of a report on Canadian chartered banks: "Banking and Poor People: Talk is Cheap". When it comes to serving the needs of poor people, their report is lots of talk and not much action. In this case, the emphasis on talk versus action serves as an accusation that the banks have failed to keep their commitment to open their doors to low-income people. The phrase 'to open their doors' is not used literally to say poor people are not allowed to come into the bank. Rather, they are not permitted to engage in the sorts of conversation and exchange of texts (checks, signature cards, account agreements, etc.) that would give them access to the banks' services. (cited in Wood and Kroger, 2000 p. 6)

This example parallels the way in which discourse analysis can be used to look at the marginalization of people (their knowledge and experiences) in the context of the South or the North. Indeed, meanings through talk or text can be interpreted differently and changed over time as well. Sometimes, there are some hidden meanings in texts or talks that requires a time and space (or a condition) to become revealed.

Data Collection

Researchers often bring "degrees of sensitivity" into a research project. The "theoretical sensitivity" concept refers to "the ability to recognize what is important in data and to give it meaning" (Strauss and Corbin, 1990, p. 20). A researcher's sensitivity as such reflects professional and personal experiences, the analytic process or creativity of the researcher, literature or documents relevant to the area of investigation, as well as what is referred to in simple language as "common sense," which is the predominant way of knowing and living among Indigenous peoples. The next section explains the criteria for selecting documents and using keywords.

Criteria for Selecting Documents and Keywords

The world may be divided into four regions: North, East, South, and West. All four corners are connected geographically and interconnected culturally to form one giant globe known as Mother Earth. On this Mother Earth all creatures were living in harmony until man started to understand his own capabilities of dominating other creatures using his knowledge. This knowledge, first accumulated in hunter-gatherer societies, eventually resulted in the birth of agriculture as man began to realize how he could domesticate plants and animals. The process of domestication gradually helped man to settle and to form different civilizations by building towns, cities, countries, and nations with borders. Grouped together as such, people started to segregate and become fragmented under various governing rules and authorities known as social norms and laws. As a result of all this segregation and fragmentation, differences became a focus and the underpinning commonalities between and among the members of society were diminished. Wilson (1995) describes this concept best:

> Indigenous people all over the world are in similar situations. Indigenous people have been preoccupied for too long with what has kept them off balance. They need to regain their own balance by shifting their attention to what it was that kept their ancestors in harmony with their environment. They need to regain that perspective and make themselves adjust to that perspective. They should start acknowledging the work of their ancestors and incorporating these perspectives into their learning, teaching, research, and writings. (p. 68)

The above passage was the main fuel for my investigation into commonalities and interconnectedness between and among all communities (including traditional and scientific ones). I consider my investigation a process of "revitalization" very similar to the concept known as "conscientization" introduced by the brilliant educator Paulo Freire, who holds a very special place in my heart (Peace Be Upon Him). His words have profoundly affected and guided my thoughts at all times. This process of conscientization similarly relies on people's knowledge and experiences from historical, philosophical, sociological, and psychological perspectives to revitalize the existing educational system by bringing awareness to both educators and educatees. We need to change our attitudes and the way we think and talk, making an effort to create a ground of communication that is as friendly as possible, a ground upon which we can shake and hold each other's hands in a unifying way focusing on our commonalities and celebrating our differences. As

Ethel Percy Adams once said, "It is only in the giving of oneself to others that we truly live."[9]

During the process of selecting and reading documents, my sensitivity was to those keywords synthesized either by scientific or Indigenous communities. Above all, the keywords that caught my eye in the literature selected and studied were those associated with discovering, sharing, and accepting commonalities; understanding, exchanging, and celebrating differences. Those are the basic requirements to pave the road for diversity.

Borrowing from Kawagley's (1995, p. 5) book *A Yupiaq Worldview: A Pathway to Ecology and Spirit*, I used his systematic approach to map out and focus on the chosen keywords embedded in the documentation. The following four primary purposes are the cores of this study (mentioned in the significance of the study in Chapter One):

- To examine some of the historical and philosophical changes in the worldview of Indigenous communities and the changes in agricultural extension programs and the consequences of the intersection between them
- To understand how Indigenous communities have adapted their knowledge, experiences, values, and principles to accommodate such an intersection
- To document some Indigenous and non-indigenous practices in traditional communities implemented by Indigenous and non-indigenous people or institutes
- To work toward an epistemological framework and pedagogical orientation in which scientific (Western) and Traditional Knowledge and communities can work hand-in-hand in a symbiotic manner.

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[9] Cited in http://www.angelfire.com/co/aplacetocrash/quotes/E.html

Kawagley (1995) notes:

> A task of this magnitude requires the eventual narrowing of focus to a few of the most critical values and principles that define the intersection between the Western and Indigenous worldviews so that the implications can be examined in such social sectors. The exploration of contrasting values and principles in this way may open doors for further research and action to begin to implement initiatives that take the best from the two worlds and reconstruct a world to fit the times. (p. 5)

Chapter 4: Presentation and Analysis of Data

Patton (1990) states, "The process of collecting data and analyzing it is never clearly divided in a qualitative study." It was for this reason that I collected my data at the same time as I wrote up my interpretation and analysis. However, in order to keep the whole process manageable, I needed to maintain a systematic way of studying and recording while keeping major themes in mind at all times. There are probably many ways of performing such a task, but my technique tended to consist of first browsing through a given text very carefully, and then reading it thoughtfully while recording, presenting, and analyzing my findings based on my sensitivity to particular keywords (key concepts) and my comprehension of connections between the findings and the given themes. The interpretation of data was carried out using thematic analysis, keeping in mind that the focus of my inquiry was Indigenous knowledge as it relates to agricultural extension theory and practice in particular.

The general framework for data analysis was to examine the data collected from agricultural extension and Indigenous knowledge case studies against three broad themes (concerns) with the following titles:

Development Paradigms: Theories and Practices (e.g., modernization, dependency, globalization, structural injustices, equity, diffusion models for innovation, technological development and appropriateness, types and levels of agricultural production and/or farming practices, utilization and/or wastage of physical and natural resources, sustainability, etc)

Educational Strategies: Theory and Practice (e.g., assumptions about teaching and learning; banking versus conscientization and empowerment; types of target people such as rural or urban, Indigenous or non-indigenous, poor or rich, young or old, female or male, and non-literate or literate, etc)

Values and Benefits (e.g., Indigenous worldviews, traditional practices, and lived experiences, culture, family, etc)

Each of these three major themes will be treated in detail in a section of this chapter. In addition, two specific sub-themes were identified and used to assess the sensitivity of extension models to Indigenous knowledge and the traditional practices of local people in selected regions of the world. A series of additional relevant sub-titles were used for the interpretation of the data and the production of meanings in/for findings (Berg, 1989; Merton, 1968; Berelson, 1952).

To facilitate the data analysis in this research study, the question of how Indigenous knowledge can be integrated into extension systems for sustainable agricultural development was examined under the three major themes mentioned above and under their two main embedded sub-themes: Agricultural Extension and Indigenous Knowledge. To expand and enliven (or bring life to) the study, I have oftentimes made reference to my life stories and the teachings of *Mashe-Ferang* in particular as a way of assisting in the analysis of the data.

Before elaborating on the three major themes (concerns) and the corresponding sub-themes and sub-titles, I will present the following section illustrating the importance of incorporating my life story and relevant lived experience.

Incorporating my Life Story

Importance of Lived Experiences

I will always attach great value to the experiences of my childhood. I have lived in interesting times with interesting people around me such as *Mashe-Ferang*. The events of the world around me, along with various environmental factors (academic and non-academic), have affected my life and worldviews. The process of writing my life story is a tremendous affirmation of my values and importance as a human being. I like to share my life experiences with my family and other people who may find them an instructive history for self-development. My life story has taught me about engaging in present realities by understanding meanings through remembering life events and experiences in the past. It is almost like opening a treasure box to uncover scenes buried in memory in order to build character and plot a pathway to live more constructively. It is full of invaluable metaphors and meanings that can be used as a relevant guide for walking into present and future life. Writing my life story has shown me how to recognize metaphors and their roles in my daily life and how to see my life more clearly.

There are many people in my head, among them, *Mashe-Ferang*, who has played a particularly important role in my life. Sometimes I hear her voice, sometimes I see her act, and sometimes I feel her joy. Her story and my story are joined, mapping out my thoughts and expressing my sensations about my lived experiences and about others around me. The past is passed and I cannot change it. But the process and product of my life, attest to what I now am, and offer a practical, concrete, and time-tested way to deal with all that transpires in my life. I cannot afford to lose my life story forever. My life story is made up of a series of interconnected events and experiences that form my personal history. It is indeed relevant to my family, community, schooling, and career.

For some time, I thought that no one was interested in reading my life story. I often felt hesitant to even begin to write my life story because I was not sure I could write well enough to bring that story to life. Most of my inspiration comes from my supervisor, Dr. Peggy Wilson, and her belief in how life stories can help people to re-examine their beliefs and engage them into action. This is like recharging your honesty through your life experiences. The Canadian historian, Dr. Margaret Ormsby (1909-1996), also inspired me, who has said, "History is made through the lives of ordinary people." She is right and she is also entirely correct when she states:

> If ordinary people don't get around to writing their stories, most traces of our lives will be lost. We need to record our own life histories because our memories are the only link we have with our childhood, our adolescence, our first job and our collective past. Everyone has a story to tell. You just need to know how to bring

these stories to life.[10]

In my focus on organizing, presenting, and critically analyzing the main research question in my study, I needed to ask myself a number of relevant questions about a series of landmarks in my life. The landmarks refer to different phases of my life through which I was able to attain new and various (perhaps different) meanings. The data from my lived experiences came out of my attempts to answer questions revolving around different aspects of my life. There are a number of important reasons that I would like to write about my lived experiences. First, I would like to demonstrate how both the philosophy of life and traditional values have been preserved in me indigenously (genuinely and originally). Second, to show how my past, present, and future are linked in search of meanings from an Indigenous worldview (boo-mee va khaw-kee boo-dan: to be a person with a great attachment to nature and living close to the soil). The English word "khaki" refers to the soil and its colour and is originated from the Persian word "Khaw-kee," meaning, "soil." Third, I would also like to furnish an account of an Indigenous person (the wisdom, knowledge, and experiences of *Mashe-Ferang*) and her positive contributions in a family and a community. Fourth, to present and examine the similarities and differences between the implementation of Indigenous knowledge offered by local people and the educational theory and practice sustained by prevalent models and strategies of agricultural extension. Suzuki (1997) has pointed out that "just as the key to a species' survival in the natural world is its ability to adapt to local habitats, so the key to human survival will probably be the local community" (p. 23).

It is very intriguing to discover how your early childhood life directs you throughout your life, affecting the choices you make and sensitizing you for the creation of passions or sentiments within you. People around you, especially the ones you have grown up with, influence and shape your characteristics. Often, I wish I could resign from adulthood and regain my childhood to rejoice in those innocent qualities of being pure, honest, and positive in my relationship to just about anything and anybody around me. This means that the peaceful or accepting characteristic of childhood is the foundation or bedding for true vision and wisdom. This is a common sense concept that holds true for many people when they reflect on the natural process of childhood. And, given the world we live in, it may seem amazing to see how many who have had no academic learning, not even so much as a basic literacy program in reading and writing, can have a great impact on our lives, whether it is for right or wrong. I don't actually like to dichotomize right and wrong as two entities independent of one another. Instead, they can be thought of as means and ends to one another. A Persian proverb says: "where have you learned politeness? From impolite ones." My life, however, has been full of positive experiences and I am thankful to those who have been my rock of patience (strength) and guiding light.

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[10] Dr. Margaret Ormsby (1909 to 1996) was the leading historian of British Columbia: http://www3.sympatico.ca/susan_neylan/bc_history/

The story that follows is more or less focused on *Mashe-Ferang*, who has been a source of inspiration for me in helping me to understand all that encircles me. She was a truly genuine Indigenous, kind, gifted, and full of practical and traditional knowledge. Her valuable oral knowledge and moral fibre are still with me, as if I were communicating with her in spirit (presence). I also specifically remember her telling children "do not let your tongue run faster than your mind." She was a teacher to many people around her, feeding us with food for thought and nourishment for our mind, heart, body, and spirit. She believed the health we are looking for is right under our feet. In his books *The Sacred Balance: Rediscovering our Place in Nature* (1997) and *Inventing the Future: Reflections on Science, Technology and Nature* (1989), Suzuki describes the limits of knowledge and points to our need to gain an understanding of the connectedness of things:

> The fundamental requirements [in life] are rooted in the Earth and its life-support systems. They are worthy of reverence and respect; that is, they are sacred. By acknowledging and respecting the balance of these elements of the Earth, we can construct a way of life that is ecologically sustainable, fulfilling and just. To see those basic human needs with clarity, we must first recognize the fact of our

> inescapably biological nature [and its connection to nature]. (1997, p. 7)

Mashe-Ferang was familiar with the concept of the interconnectedness of each and every thing around us. She used to tell us that everything we eat, do, and say counts in our life for raising children and building character. All these together show our connection to mother nature and how our past, present, and future life are connected in a meaningful way. This also reminds me of the simple and meaningful way in which Saadi (Sa-dee)[11], has described our interconnectedness: as the limbs of a body are knit together so are the people.

> All human beings are in truth akin;
> All in creation share one origin.
> When fate allots a member pangs and pains;
> No ease for other members then remains.
> If, unperturbed, another's grief canst scan,
> Thou are not worthy of the name of man.

The years of my childhood were the happiest and greatest time of my life. My life was healthy in so many ways simply because of *Mashe-Ferang*. She was a tip-to-toe genuinely Kurdish woman who was originally from the Aboriginal people of Kurdistan on the northwest side of Iran. She dressed like a Kurdish woman, could speak the Kurdish dialect, and could also speak Farsi with a Kurdish accent. She used to sing for us in Kurdish. My grandparents originated from the Aboriginal people known as Gilaki, who are mainly settled in the north part of Iran beside the Mazandarani people, flanking the southern shores of the great Sea of Caspian (from which the famous Iranian "Caviar" and "Whitefish" are caught). The Gilaki people are well known for their hospitality, peacefulness, fishery, and many agricultural activities, especially for the production of rice, tea, citrus fruits, and a variety of vegetables. They are known as the people of the sea and the mountains. The Gilaki women are very hard working and committed workers who maintain the house and farming works during the four seasons. Generally, Gilaki women are very vigorous, carrying on a heavy workload of various life responsibilities. My grandparents gradually migrated toward the south and settled down in a city called Ghazvin near the Capital city of Tehran. My parents finally moved to Tehran (the capital city of Iran) when I was in grade three in elementary school. *Mashe-Ferang* lived with us until my parents and I moved to Tehran. She also came to stay with us in Tehran, but she could not tolerate the fast pace of life in Tehran. She detested the noise and the smoke produced by the cars. She was continuously complaining about these things. She had a hard time crossing the streets and was always telling my parents; let's go back to Ghazvin where it's not as populated and polluted with smoke and noise. She was simply trying to get across her message to us that a natural and healthy life is one in which we intact with nature in a natural way or at least to the extent that is possible. *Mashe-Ferang* was more or less the key to our understanding of the philosophy of the interconnectedness of all things and nature as of the essence in our lives. Suzuki (1997) illustrates the above concept as follows:

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[11] Please see the following website addresses for more information about the life of Mosleh al-Din Saadi Shirazi: http://www.art-arena.com/saadi.htm and for his books:
Boostan: http://www.enel.ucalgary.ca/People/far/hobbies/iran/Boostan/ and
Golestan: http://www.enel.ucalgary.ca/People/far/hobbies/iran/Golestan/index.html

> All species are our evolutionary relatives, and we have a genetically programmed need for their company. As social animals, we have an absolute need for love; without it, we suffer dire psychological and physical consequences. The strength of that love is reflected in healthy, vibrant families and communities supported with full employment, security and justice. Finally, we have spiritual needs, which are ultimately rooted in nature, the source of our inspiration and belonging. These are the real requirements of all humanity and should form the basis of any society aspiring to a truly sustainable future. (p. 213)

Some Lessons Learned from my Lived Experiences

Understanding Responsibilities

Understanding responsibilities and increasing the responsibility we carry are important signs of wisdom (mental and spiritual growth).

> Responsibility is a quality of the soul that arises when we are conscious of how we interact with others. If we lack an ability to respond consciously, we'll be unable to commit to action. Or we'll lack accountability - we may say we'll do one thing and then do something different. We'll likely feel overwhelmed, off

> balance, confused, negative, helpless and perhaps even hopeless. We may seem uncaring and irresponsible. As we grow in consciousness, we naturally begin to take more responsibility for all of our life experiences. Though we cannot control what happens in life, we do have power over how we respond. As we become more soul-infused, the level of our [conscious] responsibility expands. Responsibility is an innate gift that we awaken into. It is not given to us or learned. It is a state of being. It is an indicator of consciousness. It is the foundation for deepening human relationships. (Higher Awareness Inc., 2002)[12]

To this day, I consider myself a "serviceman." I learned from *Mashe-Ferang* and family that a good and positive life is most rewarding when I put myself at the service of others, which simply means being a custodian for the purpose of helping others. As a child, my Indigenous training kept me busy at all times, helping me to be useful while being continuously admired and rewarded and staying away from getting bored or stressed out. Blessed with a high degree of self-confidence, I always remained active and a positive contributor to our family ties. Given that both my parents were working, we had a rule in our home that all of us were responsible for doing as much as we could when it came to housework and the affairs of living. From the time I was fourteen, my parents had total confidence in me to carry out a variety of these responsibilities. I made myself particularly useful during the summer (especially during No-rooz [new year's], short holidays, weekends, evenings) performing a variety of family responsibilities such as: buying groceries, preparing food, hosting our guests, painting the house, cleaning the house, working part-time jobs, and taking care of my younger sister, my grandmother, my younger cousins, and my pets. I remember that my mother was always telling me that I did a better job of buying vegetables and fruits than my father did. I was quite skilful at picking out vegetables and fruits either at our local vegetable and fruit stores or at the fresh produce market in a place called Baw-zar-e Ta-re-bar (or Baw-za-re Mee-veh), meaning the fresh fruit and vegetable market. I also knew how to get the best deal in terms of the quality and quantity with the money I had available to spend.

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[12] Cited in the following Web Site: Dec. 2002: http://www.higherawareness.com/resourcelinks.shtml

Understanding Interconnectedness Among All Living Things

The Land, Nature, and People

One of the most important issues that need to be clarified is the ownership of the land. We are responsible for the land or for environmental care, but we should never feel that we actually own the land. In fact, while we are living, we rely on the land, and when we are dead, we return to it. The land is what remains, not us. The land is what holds us and keeps us and nourishes us. Last but not least, we can also make the claim that land is what owns us since it gives us countless essential elements of life. No wonder the land, the earth, nature itself, is so deeply respected by Indigenous people as to be called "mother earth" or "mother nature," with no belief (mind-set or attitude) of ownership.

The peak of Damavand, is the highest point of the Zagrous Mountains, has a symbolic meaning among Iranians (especially among the Northern Indigenous People of Iran) as a source of understanding (or: Ascent of Motivation) for their connection with Mother Nature:

> Today's polluted industrial society has taken away the main motivation of human life and living opportunity; it has limited humans' relationships to merely materialistic factors. Besides political frontiers, many other countless frontiers of revealed and concealed restrictions made people secluded beings. Modernized community leads human beings to be gradually far from their self-reality, imprisoned in their own materialistic self, surrounded with iron barriers and biased regulations. We believe that nature is the *Mother* of all living beings so a human being belongs to nature and not nature to him [/her]. Our main motivation for choosing Mt. Damavand as a symbol of quiet nature is to make it possible for nations who come together to have pure cultural and social interactions.[13]

It is important to know the type of relationship and respect that we need to maintain with every living thing on the land and in the air and water. The poem by Saadi

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[13] Cited in the following Web Site:

http://www.araz.org/Gallery/1st%20Damavand/International%20Mt%20Damavand%20Ascent.htm mentioned earlier also shows us the importance of our connectedness with one another and every living creature. Saadi's poem has not only become an Ancient Motto (proverb) among Persian people, but has been written on a wall at the United Nations as well.

Tackling and Respecting Indigenous Values Within me

A glance through my past tells me I have had the option, at one point and another, of disregarding all traditional values within me, and moving on carelessly for the sake of moneymaking. *Mashe-Ferang's* teachings held me back, gave me second thoughts, thereby enabling me to make my life more rewarding.

A great many people have the mistaken impression that living in poverty means living in a remote area at a subsistence level without a TV, refrigerator, stereo system, or any of the other modern conveniences of urban life. It has never occurred to these people that being rich in material life often results in having a poor knowledge of (poor choices for) the makings of a positive life. Eastern philosophy perceives the concept of poverty as something beyond the mere materials of living, as something that must also make reference to the mental and spiritual aspects of life. In fact, mental and spiritual impoverishment (deprivation) is an even worse type of poverty. It is not necessarily right to measure the richness (wealth) of individuals by the amount and type of consumer goods they use, have or own. In view of this fact, many people may not be as rich in wisdom (having essential knowledge and experience) for the sake of a positive life in this world and securing happiness for the hereafter. In his book of poems, *Boostan*, Saadi writes "a poor villager (in wealth) and his spouse sleep happily in their cottage but a rich king (in wealth) could not still sleep comfortably in his palace."[14] This poem explains the king with all his wealth does not have the type of wisdom to feel the taste of true happiness. During my childhood, I lived like a simple villager and never felt myself to be poor. I lived like the happiest person in the world. Presently, I have assembled more material goods around me and am experiencing more worries and less happiness, with a feeling of being poorer in my spiritual and emotional life. Living in a palace and having a luxurious life doesn't necessarily promise happiness. We need to critically question the nature of the knowledge and experience (wisdom) we are attaining superficially. We need to make sure that our attained knowledge and experiences are aptly used to have positive contributions on our inner nature and the outer nature. When we seek knowledge we often become alienated by what we find in the outer nature and we forget about our inner nature. We need to start looking for solutions in our inner nature as well as we do in the outer nature (environment). The following story describes the relationship between our inner nature and the outer nature and why is so important not to loose the sight of either one:

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[14] This is my own translation and interpretation of one of Saadi's poems in his book "Boostan."

> An orchardist noticed that a certain grape vine failed to produce much fruit. He had almost decided to waste no more water on it when the vine spoke up. 'Please,' it appealed. 'It is not my fault if I fail to supply an abundance of grapes. It is the fault of my surroundings. I will do just fine if you give me a shield from the hot sun.' A shield was placed over the vine, but it did no better than before.
>
> Over the weeks the grape vine pleaded for other changes in its environment. It requested the removal of some nearby rocks and asked to be surrounded by flowers. Its requests were granted but it failed to keep its promise to bear more grapes.
>
> The orchardist finally woke up. He told the vine, 'It is not your surroundings which are wrong. It is your own nature. You are like some people I know. They never see that a change in environment is not a change in nature.'
>
> Unknown Storyteller

I have lived almost 18 years of my life in North America, for the purpose of accomplishing all my postsecondary educational programs. Whenever I have been studying in North America, I have been considered a Foreign or International Student. Whenever I have gone back to Iran to work, I was labelled as a product of the Western world, meaning that I was considered to be a foreigner in my homeland as well. I have no idea whether there are any significant advantages to being considered as a foreigner. But there are certainly lots of disadvantages you face as soon as you are named or labelled as a foreigner or an International person. In my case, however, no matter where I live, I am considered to be a foreigner or International in a way. I believe I have sacrificed my own national identity for a greater value, that of feeling that I am a citizen of the Earth. From what I have mentioned in above, I leave it to readers to imagine what it means to be an Indigenous person in this world known as the modern era in which majority of people are lost, confused, and blinded by the flash and glory of the modernity.

I. Development Paradigms (Theories and Practices)

A. Agricultural Education and Extension

My focus for this theme relates to development paradigms concerning the type of agricultural development imposed upon the nations of the South under the auspices of agricultural extension development programs. In the post-World War II and post-colonial era, virtually all South Nations have vigorously embarked on the goal of national "development." Apart from governments, a variety of international agencies and organizations (e.g., bilateral aid agencies, International Financial Institutions such as the World Bank and IMF) have designed and implemented a dominant paradigm of development that stresses growth, free trade, primacy of the private sector, foreign investment, and the useful and necessary role of industrialized nations in helping poor nations to modernize and "develop." However, increasing numbers of critical analysts and researchers have questioned the validity of the modernization paradigm for improving the lives of the impoverished masses. Modernization has tended to disproportionately benefit local and external elites and powerful North countries through unequal trade, the concentration of resources in the hands of a few (e.g., multinational corporations, local elites), structural inequalities, the debt trap, and unsustainable exploitation of natural resources (George, 1976). Šadik (1992) states, "in many cases development has not only failed to eliminate poverty but has actually increased it, with deadly effects on population growth and environmental damage" (p. 14). In other words, industrial technological modernization in North and South nations came to pass without adequate consideration of its effects on natural and human resources.

The first attempt to bring agricultural development to Southern contexts was made through what Vernon Ruttan calls the "diffusion model," which assumed that "Third World farmers could substantially increase their agricultural productivity by allocating technologies from the industrial countries" (Staatz and Eicher, 1988, p. 3). Other terms apparently referring to much the same thing, such as "innovation," can also be found in the history of agricultural development in South (developing) countries. The terms are different in name but are similar in practice. The idea of the diffusion of agricultural innovation was originally formulated by American social scientists in the 1950s and 1960s (Rogers, 1983). At that time, farmers were classified in term of their readiness to adopt innovations. With this in mind, the more progressive farmers were selected as targets with the hope that the ideas of innovation would *trickle-down* to the less innovative farmers. The idea of a Training and Visit (T.V.) system was introduced by the World Bank and implemented by its affiliated organizations with a focus on specific regions, subject matter, and/or concerned people. Unfortunately, the T.V. system was often directed to the better-off farmers rather than those who were disadvantaged. Adams (1982) explains that such innovations, which were supposed to trickle-down, only served, in practice, to perpetuate or increase the gap among rural citizens (between rich and poor farmers). Toh (1987) gives an example of the trickle-down effect in South Korea:

> It seems evident that except for outright charity, attempts to help the poorest sector of the rural population must depend on the *trickle-down* effect of generally increased village prosperity....any serious effort to alter local priorities would be self-defeating, which is to say that any major and direct effort to improve the lot of the landless and helpless poor will have to wait. (p. 28)

Toh (1987) further states that

> Even the World Bank, behind its rhetoric of 'basic needs' strategies to help the 'poorest', has been shown to promote in reality capitalist modernization of Third World agriculture, from which, external/local elites will benefit more than the rural masses. (p. 29)

Compton (1989) points out that over 75 Training and Visit (T.V.) programs in Third World Countries have been widely criticized by Third World officials, "who disparage [such programs as a] 'talk and vanish' system."

In the present period, there is now considerable concern over the consequences of the process referred to as "globalization." As the agenda of free trade, liberalization of economies, IMF-imposed structural adjustment, and corporate-biased regional or international regimes (e.g. NAFTA, APEC, WTO, MAI) are pushed by the North and often welcomed by South governments, the marginalization of the sectors of the poor is likely to increase. Furthermore, such globalization is beginning to impact the field of Indigenous knowledge systems. International trade and investment regimes now under negotiation, including the Convention on Biological Diversity and the Multilateral Agreement on Investment, seek the right of private actors to patent the resources and Indigenous knowledge of the Third World (Cleveland and Murray, 1997; Snell, 1996). This constitutes a form of "bio-piracy" whereby powerful agencies (e.g. multinational drug corporations) gain control over Indigenous knowledge in order to exploit it for financial gain. As Cleveland and Murray (1997) have noted:

> The globalization of resources and the problems caused by increasing rates of resource use and degradation have increased conflict over the meaning of, and rights to, resources that have previously enjoyed a somewhat separate existence in Indigenous and industrial worlds. (p. 3)

Snell (1996) uses the term "bio-piracy" to show how "Indigenous peoples' knowledge, their resources, and even their bodies are being pirated, and they receive little or nothing in return" (p. 7). The impact has been so profound worldwide, Snell adds, that this "modern-day bio-piracy" represents "a potential gold mine" and is no longer simply "the product of new science and corporate greed, but also of new law" (p. 8). The lure of astronomically high profits apparently does not permit moral or ethical discussion as to whether life forms (the products of nature) ought to be patented. Snell (1996) points out that:

> The manipulation of living materials to create new types of medicines and

> agricultural products is currently worth $2 billion a year in the United States [alone]. Estimates are that biotech profits will soar to $50 billion by the year 2000. Most of the "raw material" for this booming industry comes from the world's dwindling rainforests of the Southern Hemisphere. (p. 12)

It is emphasized in a report about bio-piracy as a new threat to Indigenous rights and culture in Mexico that it is important to know what is 'bio-prospecting' (also mentioned in Snell, 1996) and how it relates to bio-piracy:

> Bio-prospecting is the search for biological resources and accompanying Indigenous knowledge -- primarily for the purpose of commercial exploitation. As such, while bio-prospecting is not inherently contrary to the interests of Indigenous peoples or a threat to biodiversity, it facilitates bio-piracy. In other words, bio-prospecting identifies biological resources and traditional knowledge with commercial potential, while bio-piracy appropriates these resources and knowledge (or privatizes them for commercial gain) without obtaining Prior Informed Consent (PIC) or awarding just compensation.[15]

Bio-prospecting and bio-piracy are becoming a very lucrative business activities for some small and large businesses for patenting genes in crops and medicinal plants used by Indigenous communities and as well as becoming more specialized in the exploitation of bacteria, enzymes, microbes, and so on. These businesses are well established and have gained so much power over governments as it is described in the following section:

> The agro-chemical companies are now putting direct pressure on governments, or through multilateral bodies such as the WTO, to grant them broad or exclusive rights on aspects of the innovations, especially those having to do with biodiversity. The rural poor will be excluded, in practice, from any compensation and benefits of the development of the bioengineering being carried out by the great agro-chemical companies.[16]

The question such as who will compensate the Indigenous communities for their centuries old work in the improvement and protection of biodiversity is not much of an importance and the Rural Advancement Foundation International (RAFI, with headquarters in Canada) says:

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[15] This information is retrieved on April 03, 2003, from http://www.globalexchange.org/campaigns/mexico/biopiracyReport.html.

[16] ibid

> By extending intellectual property systems to the world level, the monopoly of control over biological processes and products puts world food security at risk, undermines conservation and sustainable use of biological diversity and threatens to marginalize the world's poor even more.[17]

The ramifications of the increasing popularity of the branch of science known as biotechnology also need to be carefully considered. Although biotechnology claims that it can offer some alternatives to reduce the use of herbicides and pesticides by substituting genetically altered or 'herbicide-resistant crop varieties, it can also become a threat to Indigenous resources. The major genetic diversity is centred in the poorer, less developed countries of the world. It is important to be sensitive about the effects of any type of technology on socio-economic conditions of this region of the world in particular. Ho (1996) stated on behalf of Green Peace International:

> The very basis of sustainability and long term food security of the South is now under threat as the result of agricultural biotechnology promoted under the Convention Pilfering of biological diversity has intensified as agricultural biotechnology drives "gene-hunters" to prospect for commercially lucrative genetic resources in the South, in the new regime of intellectual property rights that allows the patenting of living organisms and their genes. Large proportions of the biological diversity of the South are already held in gene banks, and the North is insisting they should be freely available for exploitation by Northern biotech interests. (p. 1)

Some side effects of biotechnology on farmlands include poisoning of farming families through allergies effects from food chains toxic effects of agricultural lands or/ and farming environment, the contamination of groundwater, spread of antibiotic resistant genes, creation of new bacteria and viruses, reduction of Indigenous agricultural and natural species, increasing the pest-resistance insects and herbicide-resistance plants, and so on. (Ho, 1996; Doyle, 1989). Ho (1996) believed that "rather than the promotion of genetically modified foods and the risks they bring, we should support the conservation and sustainable development of Indigenous agricultural biodiversity, which will better guarantee long term food security for all (p. 5) Ho (1996) in his answer to whether genetically modified foods can feed the world or improve nutrition, he emphasized that that agricultural biotechnology cannot alleviate the existing food crisis and he described:

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[17] ibid

> On the contrary, the use of genetically engineered food crops is inherently unsustainable, hazardous to biodiversity, human and animal health. Genetically modified crops will not encourage diversity and sustainability in agriculture or improve nutrition. The technology builds on monoculture crops, which rely upon high inputs of pesticides, fertilisers and heavy mechanisation. The production of genetically engineered herbicide resistant crops such as Monsanto's glyphosate resistant soybean is one particular example of this. Good nutrition depends upon a mixed balanced diet that cannot be achieved through the transfer of single genes. The nutritional value of a combination of rice and beans will always be greater than transgenic rice with a bean gene. The promise of 'high-yielding' and 'nitrogen-fixing' crops to solve world hunger is irresponsible. Yield is a complex character dependent on many still largely unknown genes as well as on environmental conditions. (p. 2)

Although some scientists consider the modification of crop products through genetic manipulation an efficient means of helping to feed the world, some other thinkers and consumers question the wisdom of tinkering with mother nature. In his critique of biotechnology as a new revolution, Anderson (1990) draws an analogy between what biotechnology is doing and what the Green Revolution did to the people and the earth. He argues that:

> Agricultural revolutions are not universally popular. Many people are bitterly critical of the1960's green revolution, which produced food that saved millions of lives and turned countries like India into food exporters but also favoured richer farmers and made agriculture in those countries heavily dependent on fossil fuels. (p. 9)

It is important to give some examples of the devastation caused by the Green Revolution, which was designed to bring agricultural development to the nations of the Third World. The following examples are cited by the IAD (1990): dependency of farmers in the Third World on intensive inputs of all kinds; indebtedness and breakdown of self-sufficiency; denial of small farmers and food production for local people; degradation of lands and forests; contamination of sea and groundwater; erosion of genetic resources; increase in plant diseases and health hazards; loss of farmers' confidence in their traditional knowledge; imposition of various inappropriate structural adjustment programs on Third World nations; domination of international and national corporations over all essential aspects of farming activities. Toh (1987) has recalled:

> The fatal history of agricultural extension education is sponsored by corporate agencies such as the Rockefeller and Ford Foundations, often in collaboration with state aid organizations. These extension education activities were cast in the mould of US capitalist agriculture and ignored general fundamental class inequalities prevalent in underdeveloped Third World societies. Such ideological bias is not surprising, for as other critical analysis of US or Western sponsored 'land reform' and 'Green revolution' campaigns indicates, their motivational roots lie in preserving Third World capitalist dependency and forestalling radical transformations. (p. 32)

Each of the prevailing dominant development paradigm either modern (Western) development (as an outsider) or religious structural development program (as an insider) have their own rigidity toward certain categories during the process of development such as problems of understanding, mono-cultural dominance, moral-spiritual values, human rights concerns, socio-economical and political schemes, and levels of professionalism and etc. However, in recent years, due to high degree of conflict of interests between government and local (grassroots) people there has been some resilience toward non-government organizations (NGOs) to take part in development programs. Not all NGO's are truly people centred and locally based. One of their recent advocacy strategies under empowerment programs to bring changes in development education is the implementation of Appropriate Technology (AT). There are some locally based NGOs who advocate for the use and manufacturing of local technology. On one hand, Stewart (1987) support the idea of appropriate technology by saying that the goal of AT:

> was to spread the benefits of technology and investment across the population, and to incorporate everyone, not an elite minority, in the process of development. The concept grew in reaction to the creation of dualistic, inegalitarian societies due to the unselective introduction of modern technology into poor countries. (p. 104)

On the other hand, in a strong critique, Eckaus (1987) pointed out that:

> The AT movement had accomplished little, due to loose reasoning about what 'appropriate' means, and due to simple-minded technological determinism – e.g., the view that inappropriate technologies were the 'single barrier' to development. (p. 65)

Eckaus described the reason why the AT movement remained popular was that it was "easier to use technology as scapegoat for social, economic, and political problems, as though technology is disembodied from context" (1987, p. 65).

B. Indigenous Knowledge

Indigenous agricultural and environmental knowledge has gained global recognition through the United Nations Conference on Environment and Development (UNCED) in 1992 and, more recently, through many other centres, organizations, and institutions (see Appendix B) that are concerned with Indigenous studies and sustainable development. This knowledge, constructed through years of invaluable experience, has been transmitted from elders to younger generations in numerous family-oriented societal systems worldwide.

Indigenous knowledge is clearly at a stage of transition. Some modernizers view Indigenous knowledge as having its own limitations and often consider it to be an obstacle to development. Agrawal (1995b) suggests that not only should there be a clear distinction between "Indigenous" and "western" knowledge, but there is also a need for understanding the relationship between knowledge and development. He also inquires as to "what is seen to be Indigenous in the Indigenous knowledge conceptual framework" (Agrawal, 1995b, p. 3). Of course, it can also be asked what is seen to be "modern" in the framework of modern knowledge. As mentioned earlier, it is unethical not to ask what social, economic, political, and even cultural impacts modern sciences have had on human beings, the environment, and future generations.

For the longest time, agricultural extension writings were entirely concentrated on

Western (Modern) Scientific Knowledge. Just over a decade ago, a few scholars dared to ask why no one is speaking and writing about Indigenous people and their knowledge (IPK). Even today, when we write about IPK, we are still forced to look at and evaluate these matters from Western scientific viewpoints. In fact, one of the shortcomings of the Western scientific approach is its unwillingness to grant legitimacy to non-Western scientific knowledge (methodology) or to make itself subject to critique by systems of knowledge other than itself. Given that this is the case, given the bias that exists, and given that we have to get our writings approved and completed in a scientific environment, it is easy to see why so much support and credit is given to Western scientific knowledge and so little is given to IPK. Just for a moment think about the answers to the following questions, and your common sense will tell you how much misery has already been generated by Western scientific thinking and approaches: What benefits have development programs or concepts brought to us? Has there been any comparable development in our character or in terms of justice and peace? Has there been any development in our ethics and morals and values? Has any kind of code of ethics been formulated (in what way, by whom, and for what reason)? Clark (1991) comments on the importance of Indigenous knowledge and how Western (Modern) scientific communities generally view it:

> Modern scientific knowledge is centralized and associated with the machinery of the state; and those who are its bearers believe in its superiority. Indigenous technical knowledge, in contrast, is scattered and associated with low prestige rural life; even those who are its bearers may believe it to be inferior. It is difficult for some scientists to accept that they have anything to learn from rural people, or to recognize that there is a parallel system of knowledge to their own, which is complementary, usually valid, and in some respects superior. (p. 10)

Some scientists suggest that the rediscovery of Indigenous knowledge, once subjected to a more rigorous analysis, may bring solutions to some urgent world problems. Many researchers believe that Indigenous knowledge may lead them to find the cure for AIDS, and even cancerous diseases, in the rain forests of the Amazon and in other tropical regions of the world (Suzuki, 1989; Shiva, 1989). Here is one of the numerous examples of bio-piracy reported by Rural Advancement Foundation

International (RAFI)[18]:

> The RAFI has documented many cases of bio-piracy. One of the most controversial has to do with the patent awarded by the United States government concerning human cells extracted from a 26-year-old Indigenous Guaymi woman (Panama). The blood test was of interest because the Guaymi Indigenous are carriers of a unique virus, whose antibodies could turn out to be useful in research into AIDS and leukemia.[19]

Today, our living circumstances have changed drastically by the advancement of technology and a rapid paste of life, not thinking critically and instead becoming a neutral individual, rushing through everything, spending less time with family, friends, and relatives, having more worries and busy working and making money, and giving less attention to our true mental, physical, and spiritual needs and our connections with mother nature. The following sweet memories from my lived experiences during my childhood reminds me of fulfilling majority of living qualities when I was more intact with my traditional (Indigenous) life.

Our nature demands a connection to nature. A healthy life means to live in and with nature. I fondly remember how, during Spring, Fall, and Summer in particular, we used to go to villages near Ghazvin to engage in picnicking, rock climbing, swimming in the river, catching fish, hiking, biking, and picking/harvesting fresh produce, fruits, nuts, and berries for free or a very nominal cost. *Mashe-Ferang* was always a source of inspiration to us when we were out picnicking and camping in nearby villages and mountains. She knew through experience and wisdom that we need to stay close to nature and learn from those who live in/with nature.

I strongly believe that what I have learned and come to understand about nature and its creatures all stems from *Mashe-Ferang's* practical teachings. My mother, my grandmother, and my father in particular also had a great deal of respect for her wisdom. My father was inspired by *Mashe-Ferang* to get out into nature and spend time playing with us, whenever he could. I remember how my dad used to give my brother and I a ride on his bike all the way to a big fruit and vegetable garden in Ghazvin called Hokm-Aw-bawd. We used to leave home early in the morning at just about sunrise and have a delicious breakfast in Hokm-Aw-bawd or in some other nearby village. Our breakfast was usually a homemade brown wheat bread baked by *Mashe-Ferang*, boiled fresh eggs from our hens, one hundred percent top quality cream collected from sheep's or cow's milk after it was boiled and cooled down, and pure honey in its comb purchased from the farmers nearby. Our snacks, always very healthy and full of mineral nutrients, included dried fruits like apricot, cherries, figs, and peaches. We used to make tea at Hokm-Abad. Other times we were the guests of one of the villagers, who served us tea or fresh boiled milk or even a complete "omelette" meal of fried eggs with onion, tomatoes and some fresh or dried herbs or vegetables.

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[18] Action Group on Erosion, Technology, and Concentration (ETC), formerly RAFI - the Rural Advancement Foundation International: http://www.etcgroup.org

[19] Retrieved on April 03, 2003 from http://csdngo.igc.org/agriculture/agr_chiapas.htm. For more information refer to: CIEPAC A.C. Center for Economic and Political Investigations of Political Action: A non-government and non-profit organization (http://www.ciepac.org/, ciepac@laneta.apc.org)

Mashe-Ferang taught us to believe in the power of healing that exists in nature. My brother and I used to catch little fish and leeches from the freshwater streams and ponds. We had a small pool in our yard containing lots of colourful fish caught from fresh water sources. My brother, sister, and I used to feed these fish, and we played with them every day during the summer time. *Mashe-Ferang* knew how to use these leeches for the "*He-jaw-ma*t," which is a traditional way of sucking out someone's blood to clean the blood system (body fluid) or treating people for high blood pressure. Her knowledge of how to heal various common ailments and her skilful use of different types of herbal remedies and massage therapies was highly regarded in the family and by many others in our neighbourhood. She had an assortment of methods that allowed her to treat persons of all ages and genders. I can still remember some of her most popular remedies, such as the way she treated various kinds of stomach pain among children and adults, body aches such as in your back, leg, hand, head, or neck, and skin problems such as going pale, rashes, warts, wounds, and insects bites. She was also a traditional midwife who knew the A to Z's of dealing with a pregnant woman and her infant from the time the woman decided to get pregnant to pregnancy to the time following childbirth. She not only prescribed essential nutrients for the mother and the newborn baby, but also provided various attentions to maintain and adjust the family in their physical health and spiritual needs. She also brought in the whole community of relatives and neighbouring friends for their support and contributions, commonly known as Ham-Yaw-ree, meaning helping each other in-kind and sympathizing without expecting anything in return.

Apart from enriching daily life, as we have just seen, Indigenous knowledge is essential for development, and it is often been suggested that it "must be gathered and documented in a coherent and systematic fashion" (Warren and Rajasekaran, 1993, p. 3). Warren and Rajasekaran (1993) further suggest that "Indigenous knowledge is a science that is user derived and scientist-derived, and its utilization in development efforts provides long-term advantages that complement the contributions of conventional top-down agricultural technologies" (p. 4). The whole idea behind the use of Indigenous knowledge is to bring the researcher-extensionist-farmer community together at all times within a paradigm of positive development that meets the needs of all people and promotes social justice, cultural solidarity, bio-diversity and sustainability.

II. Educational Strategies (Theories and Practices)

A. Agricultural Education and Extension

The design and implementation of agricultural extension is always accompanied by an explicit or implicit educational theory and practice. Most people, as well as theorists such as Mosher (1978), think of extension as an educational activity. Kesley and Hearne (1955) define extension as "an out-of-school system of education in which adults and young people learn by doing" (p. 7). One of the greatest challenges in almost all extension activities has always been, and this is in fact part of its philosophy, to set and modify its educational goals and objectives in accordance with its clients' needs and interests (Kesley and Hearne, 1955; Mumford, 1940). Unfortunately, this philosophy has been changed throughout the evolution of agricultural education and extension through the adoption of a scientific-based knowledge and through the devaluation of a culture-based knowledge. In other words, classical education – including philosophy, history, culture, ancient languages, and moral values – has started to lose its value in the eyes of society.

Mumford (1940) states that not very long ago "there was a general acceptance of the idea that knowledge of how ancient peoples had solved the difficult problems of living was the best pattern for the people of the American democracy" (p. 9). But this idea was challenged because the knowledge in question appeared to mainly belong to the "knowledge of vanished civilizations" (Mumford, 1940, p. 16). Mumford (1940) points out that the negligence of those who were not able to recognize the meaning of democracy extends also to their denial of the need to preserve "vast undeveloped natural resources, the knowledge of materials and forces of nature, with their ignorance extending also to minerals, to waterpower, and to forests" (p. 17). Mumford (1940) wondered, "why the leaders of thought in the great educational institutions of the time failed utterly to sense this problem" (p. 18).

Although Mumford has stated that science was in its infancy during this time of ignorance, I believe that it still is in its infancy and has thus far created irrecoverable harm to human beings and the planet Earth. It is valid to ask whether human negligence could lead the world to a better and more gradual and more sustainable progress than what we have inherited from the rapid process of development. After all, under today's rapid development, we are still taking backwards and forwards steps in search of sustainable development. Mumford (1940) believes that the development of land grant colleges in the United States enhanced the development of various forms of knowledge and modern sciences, allowing the practice of liberal education to make connections with the past and relate it to the present through the use of culture and language. Gradually, however, these major tools of liberal education, namely culture and language, became less diversified and were finally transformed to the dominant forms known as Western culture and the English language, respectively. Today, in practice, liberal education is not based on a true culture or a true language. It is rather based on the synthesized culture or language that arises from the dominant paradigm. And, normally, the assumption is that everyone can only or should only benefit from this monochrome language and/or cultural setting. Earlier paradigms of extension, as mentioned earlier, have often been biased towards treating the farmer as the passive recipient of the knowledge and skills provided by the expert extension agent. Consequently, the modernization of agriculture and rural development has proceeded through the importation of external blueprints that often fail to acknowledge either local conditions or realities or social and cultural frameworks.

B. Indigenous Knowledge

Taking the concept of learning by doing or hands-on experience and thinking of *Mashe-Ferang's* teachings led me to the conclusion that she was very much an extension agent from head to toe. *Mashe-Ferang* also taught me how to do various types of gardening work such as planting seeds of various vegetables, melons, and flowers. *Mashe-Ferang* was always very sensitive as to how and when we watered the plants. Watering had to be done later in the afternoon by running the water through the vegetable furrows slowly and sprinkling the water gently at the bottom side of flower stems or bushes. I also learned that weeds are to be dealt with at a time when the soil was not too moist or dried out by pulling the weeds out while they were small and before they flowered. We used to fertilize our soil with cow, horse, sheep and goat manures or the droppings of the hens and ducks. Another rich source of fertilizer for our little garden was the water from our little pool. Harvesting or picking vegetables or flowers was also a very enjoyable and exciting task.

My brother and sister and I used to sit around *Mashe-Ferang* with our grandmother and mother to clean, wash, dry, can, and package our harvests, which included vegetables, fruits, nuts, and other food products. We also used to do a lot of food preparation and processing such as drying lemons, bottling lemon juice, making tomato pastes, making all types of jams and pickles, producing vinegar and syrup (Shee-reh) from ripped sweet grapes and (Awb-ghoo-reh) from sour-raw grapes. The list could go on and on, but I think it suffices for now. I could also provide detailed information about the health benefits of each of the above, but instead I will merely say that these benefits were numerous, as were the economic and social benefits (especially in terms of family ties) that came from these food preservation activities. *Mashe-Ferang* also taught me many valuable lessons about how to keep, treat, and raise different domestic animals in our yard such as chickens, cats, pigeons, and ducks. She also taught me how to cut and process different types of meat for cooking and preserving.

Warren and Rajasekaran (1993) emphasize, "there is more to learn from Indigenous peoples (local knowledge system and experiences) than to teach them…. It is feasible, efficient, and cost-effective to learn from the village-level experts and the originators of IK" (p. 5). Warren and Rajasekaran (1993) have considered three major steps for linking IK systems and agricultural extension, namely participatory on-station agricultural research, conducting on-farm farmer-oriented research, and validating farmer experiments. The active participation and interaction of research scientists, extensionists, and farmers is necessary in all three steps to build a meaningful relationship between Indigenous knowledge and extension practices. To accomplish this, we should carefully study "the science and technology of local people, the knowledge and skills they have, and the problems they feel are important to consider" (Knamiller, 1989, p. 8). It is vital to create a learning environment such that staff and local people (farmers) can work together collaboratively and interactively.

In this regard, Paulo Freire's (1972) well-known philosophy and theory of "conscientization" can be implemented to foster the farmers' critical awareness of their own history, culture, and societal realities. Freire emphasizes that people's critical learning can be enhanced if they are able to analyze the root causes of their personal conditions within the wider social, economic, and political structures and relationships that keep them marginalized and oppressed. In other words, in contrast to a 'banking' model of pedagogy, conscientization facilitates active learning, leading to empowerment and action aimed at transforming personal and societal realities. To Freire (1972):

> The dominant, oppressive praxis amounts to cultural invasion and the imposition of worldview as long as the ultimate seat of decision is with the 'invaders'. He warns that even the discovery by oppressors of their oppressive nature may not engender true solidarity, but paternalism leading to still more dependency. Only entering the situation of the oppressed breaks through this limit. (p. 43).

Over the past few decades, Freirean theory and practice has been applied with useful outcomes to literacy and other educational activities in grassroots development for the rural and urban poor (Archer and Costello, 1990).

Von Glasersfeld's (1995 and 1992) idea of "constructivism" can also be used to assess the paradigm of extension teaching and learning. As Von Glasersfeld points out, people apply their knowledge and experiences during learning processes to gain and build more knowledge and experiences. Furthermore, they also use their new knowledge and experiences in their daily life activities and therefore builds upon their past knowledge and experiences. Since Indigenous or traditional knowledge is a "practical" knowledge that relies mainly on people's experiences, the concept of constructivism can play an important role in assisting people in constructing new understandings and practices based on their experiences. Constructivism can be used as a method for teaching, learning, and implementing traditional (Indigenous) knowledge and experiences. When people gain more experience, they become more knowledgeable, which in turn leads them to seek out more relevant knowledge and gain more relevant experiences. This in itself also produces a constructive (positive) attitude (or true appetite) for learning and gaining knowledge and experience. Knowledge and experience work hand in hand together as the basic ingredients for learning and teaching. Therefore, it is very important to respect and take into account the knowledge and experiences of the people you are dealing with (Sabetghadam, 1996).

Another dimension of educational theory and practice that needs to be embedded in the curriculum of extension education systems is the concept of values education. As critical educators such as Freire have stressed, all knowledge systems are permeated with values. Hence, education is not a value-free activity, and the task of all teachers and educators is to help learners critically understand the values underpinning the knowledge and experience they are considering applying to their lives and situations. In linking values education with the goal of constructing a peaceful, just, and sustainable world, Toh and Floresca-Cawagas (1990) note:

> The challenge is to engage in the difficult tasks of weeding, while patiently watering the seedlings so that they can grow and bloom to begin another cycle of birth and rebirth. And eventually, there will be enough citizens with a deep love of humanity and of our Mother Earth to build the truly compassionate, just, gentle, humane, and people-centred society we deserve to be. (p. 15)

Agricultural students and extension agents graduating from agricultural formal education and training programs need to learn, value, and integrate traditional farming practices and applications of Indigenous knowledge into their work. In this regard, Kroma (1995) has been highly critical of modern educational systems, stating that:

> Schooling undermines Indigenous knowledge in three ways. First, it fails to put forward Indigenous knowledge as worthwhile subject matter for learning processes. Second, it limits the exposure of children to local knowledge of their communities. Third, it creates attitudes in children that militate against the acquisition of local knowledge. Schooling tends to promote Western-type knowledge and values at the expense of local knowledge and values. (p. 15)

Kroma recommends that even children in elementary schooling should be exposed to local knowledge and culture. He states that in most schooling systems, children are separated from the world that surrounds them and are thus the victims of the "inadequacies of educational practices" (Peacock, 1995, p. 152). Well aware of the value of local culture, Kroma (1995) has argued that even "science and mathematics would be more popular [meaningful and relevant] if course content reflected the Indigenous knowledge of local communities" (p. 6).

I remember how, when we moved to Tehran, we lived in an apartment without a yard where we could grow plants and keep pets. For the first three years it was exceedingly difficult to get used to a new city, a new place, a new school, new friends – and to people who were so different in many ways in their views about being connected to nature. I remember that I knew more poems and songs than any of the other kids in our school. My parents were teachers and they taught me lots of poems and songs. My brother, and my younger sister in particular, knew lots of poems and songs as well. Our parents had lots of time to spend teaching us before we moved to Tehran. I remember how I could read my Farsi book and even the Qur'an (in Arabic) much better than all the other kids who were in grades 3 to 6. In fact, my Farsi and Arabic teachers in particular used to ask me to read first and then the other kids would have to follow me word after word and sentence after sentence. Now, when I think back on and talk about this part of my life story it brings tears to my eyes. At some point along the line, I started losing touch with nature and I started losing the feeling I once had for nature and its beautiful creatures. For me, no loss was ever greater than losing touch with nature.

When I think back, it is apparent how much more I knew because I had lived so close to nature and on account of the people I used to live with. At the time, it was *Mashe-Ferang* who I missed above all, especially at my bedtime and in the early mornings. It was as if I could still imagine and feel her hands smoothly moving through my hair and across my shoulders and her lips kissing my forehead and cheeks. I used to practice my poems and songs by reading them to *Mashe-Ferang*, who received them with her true love, warming hug, sweet smile, and juicy kisses. When I was four years old, I can still remember how she was still carrying me on her back, and in return I had to sing for her until I went to sleep. I remember how I would count the days until Norooz (Iranian New Year) or the arrival of summer when I could go back to Ghazvin and stay with *Mashe-Ferang* and some of my relatives. It was only during Norooz and summer vacations that we could have lots of fun going to Hokm-Aw-bawd and nearby villages to picnic, to play in nature, and to eat real tasty vegetables, fruits, and foods (honey, milk, eggs, rice, fish, chicken, and meat).

In Tehran, I could no longer easily find broken branches to play with or make my own bow and arrows from. Instead, I had to go to a nearby carpentry (lumber) store to purchase some pieces of wood. I loved playing with wood. I bought a fine saw, and the first thing I used it to make was a little chicken house. We had an access to our roof where it was flat asphalt, and that was where I secured my chicken house against a wall. I remember that when I showed it to my dad, he knew right away what I was going to ask him next. But he still had to convince my mom to allow us to buy two chicks that I could raise. My bother and sister and I insisted and cried and cried some more, and finally our mom agreed. We felt as happy as if the whole world had been given to us. The next day we bought two chicks and a new series of stories began.

The schools that I went in Tehran were not keen with rural kids and their rich worldviews, traditional knowledge and experiences. Kids from rural areas were often laughed at for their accents, costumes, simplicity, and their strong ties and sentiments to their own cultural values (family, community, nature, so on…). If it had not been for my competency and creativity (rooted in my rich teachings, knowledge, and experiences gained from a traditional life setting during my early childhood), I would not have found it easy to survive in the schooling system set in a new urban life style. It was long and harsh experience coming from a traditional rural background to an urban centre that placed little or no importance on traditions. I learned that the hard way, and that is perhaps why today I see the importance of doing such a study with this hope to reducing the gap between these two ways of life. To this very date I have survived and yet have a feeling of responsibility helping people like me to walk from one world to another without any feeling of hostility.

III. Values and Benefits

A. Agricultural Education and Extension as an Indigenous Concept and Practice

A well-known slogan in today's world is "think globally and act locally." It makes a lot of sense when you think of the reciprocal relationship between the individual and the collective. Just as individuals together form a larger community, their local knowledge also forms (becomes) our global knowledge. Global knowledge is nothing but a collective knowledge of all or many instances of local knowledge.

In initiating agricultural extension programs, it is critical to value people (farmers) and to put their needs first. Based on a preliminary needs assessment, the educational activities of extension programs can become more meaningful and relevant to the welfare of the small-scale producers. Extension should carefully take into consideration all aspects of human life such as culture, religion, spirituality, feeling, politics, economics, and the care for all living creatures and the environment in general. It is also essential to become familiar with the local language and terminologies if there is to be an effective communication with the people or learners. Local people (farmers) have their own ways of interpreting their surrounding environment such as in regard to soil types and crop varieties, and the tasks of farming. Compton (1989) usefully reminds us of the important contributions of "anthropology and ethno-science [that] have allowed scientists to gain [a] better understanding of how a culture perceives its universe through its language" (p. 24). Compton (1989) goes on to explain:

> The approach requires an in-depth knowledge of local language to record formally just how people use language to define their physical, social, and intellectual environments and how these knowledge systems enable the decision-making process to function. (p. 27)

A common sense approach (as a common language) should be employed to understanding and communicating with people, as they also use natural common sense knowledge and experiences to deal with their everyday jobs and responsibilities. Knowing the local culture and the local language opens the gateway to understanding the local knowledge and experience. There is a reciprocal relationship between language and culture, just as there is between knowledge and experience, between teaching and learning, and between the alphabet and the vowels (Sabetghadam, 2002). To speak and communicate appropriately, both spectrums (entities) should be taken into account.

Particularly when you make a journey through a foreign land, it is extremely important to be familiar with and respect the rights of all persons of different ages and genders in accordance with local customs, norms, and rules. A special respect should be given for the elders of the community as well. The most important value of all is the justice that should be maintained in people's lives at all times. The seeds of justice are kindness and forgiveness, which should be planted in our hearts and cultivated by our patience to produce and harvest peace, the fruits of justice. Toh (1987) notes that, under the current circumstances prevailing in most rural areas in Southern (developing) countries, this is still a long way off:

> As the case studies bring out so vividly, [the rural areas] are typically characterized by highly uneven access to productive resources such as land, water, and capital; by traditional social stratification and division based on caste, lineage, religion, and sex; and by political and economic institutions and practices that reinforce the existing structure of privileges, exploitation, and inequalities.... Those in power are naturally fearful of any intrusion or innovation that might upset the *status quo* at their expense. (p. 34)

Local knowledge provides valuable lessons from the past that can be used to build the future. Nowadays many scientists admit that today's inventions and discoveries owe a great deal to the knowledge of local or Indigenous people. Snell (1996) states that in this era of the global economy, "corporations use the folk wisdom of Indigenous people to locate and understand the use of medicinal plants and then exploit them commercially" (p. 12). Clearly, such corporate practices do not promote a paradigm of people-centred development and extension strategies.

An ever-expanding pool of knowledge has demonstrated just how valuable traditional agricultural practices have been to various local communities even in these modern times. In the history of humankind, one of the most important contributions following from the invention of agricultural has been the formation of more complex societies or the rise of civilizations. Among all discoveries of the ancient era, the traditional agriculture of Indigenous peoples still raises as many questions in the minds of archaeologists and natural scientists as any other. As a matter of fact, it is still one of the greatest mysteries of the ancient era. The agricultural revolution first occurred in South Western Asia along

> … the hilly flanks of the Tigris and Euphrates rivers and in the hills of western Iran, southern Turkey, and the countries just east of the Mediterranean Sea. The principal reason that agriculture developed in this area is that the wild ancestors of wheat and barley and many of our domesticated animals lived there. (Frankfort, 1946, p. 7; Dawe, 1996)

Extensive research has shown that the domestication of grain crops (e.g. wheat and barley) and animals (e.g. sheep, goats, pigs, and cattle) originated in the "near East" in the region known as the "Cradle of Agriculture" (Leonard, 1973) and was subsequently developed in many other parts of the world around 6000 B.C.

The value of traditional agriculture becomes more appealing to us when we realize the destructive effects of the rapid growth of modern agriculture. For example, Suzuki (1997 and1994) reminds us about the problem of "bio-magnification," meaning the cumulative destructive effects resulting from the use, mismanagement, and handling of pesticides and other chemicals. Traditional agriculture is certainly something to ponder. Sanders, for instance, points out that according to Borah-Cook's (1969) research, "overall Aboriginal agriculture potential was equal to that of the early twentieth century" (cited in Denevan, 1992, p. 33). Denevan (1992) states, "there is increasing evidence that in many parts of the world agricultural productivity was significantly greater in the past than today, and that the differences are not always due to subsequent environmental deterioration" (p. 34). Weatherford (1988) points out that "the Indians [First Nations of the American] gave the world three-fifths of the crops now in cultivation" (p. 81).

Over the past few decades, an increasing number of valuable reference sources have pointed to the value and benefits of Indigenous agricultural systems. As listed by Compton (1989), these include:

- A plea for Indigenous agronomics
- The role of Indigenous knowledge systems in the design of national agricultural census questionnaires
- The role of Indigenous potato taxonomies in allowing scientists to understand potato-cropping behaviour
- Discovering the Indigenous criteria used by small-scale producers in deciding not to adopt certain agronomic recommendations on fertilizer application
- Effective agricultural decision-making
- Farmers' knowledge of alternative management practices, cropping patterns, sources of inputs, information, and markets
- The role of Indigenous knowledge systems in improving the capacity of extension workers to communicate with small-scale producers

To illustrate the value and practicality of traditional agriculture, we will now turn the reader's attention to examples from the following regions of the world.

The Middle East

According to the available evidence, the birth of agriculture can be traced to the planting of wild barley and wheat by settlers, "nomadic bands of hunter-gatherers" (Leonard, 1973), in the north of the Arabian Desert as early as 8000 B.C. Robert J. Braidwood of the University of Chicago has commented positively on the farming in the foothills of the Zagrous (Al-bowrz) Mountains (This region – which in modern terms extends from the Northern part of Iran to the Eastern part of Iran and the Northern part of Iraq – has become known as the Cradle of Agriculture: in about 6500 B.C.

> The remarkable constellation of plants and animals [in this region] became the basis for the food-producing pattern of the Western cultural tradition. Nowhere else in the world were the wild wheat and barley, the wild sheep, goats, pigs,

> cattle and horses to be found together in a single natural environment. (Leonard, 1973, p. 9)

Almost 4000 years later, signs of cultivated farming appeared in various parts of the world, namely in "North China, Mexico, and Peru" (Leonard, 1973). In 1966, Professor Jack R. Harlan of the University of Oklahoma found an unusual variety of wild wheat (einkorn: *Triticum boeoticum*) in Turkey. The dense population and pure stands of ripe einkorn growing on the rocky slopes of a volcanic mountain (Karacadag) surprised professor Harlan. On the basis of subsequent studies, he came to the conclusion that this grain is extremely easy to harvest even with bare hands, without the need for machinery (Leonard, 1973). He has also discovered that this grain has 50 percent more protein in it than does hard red winter wheat (the modern grain grown on the great plains of the United States and Canada for bread flour). According to his calculations:

> On Karacadag during the three-week ripening season, a family of ancient reapers equipped with flint sickles or only their bare but callused hands could gather more grain than they could possibly eat in a year. No farming was necessary; the wild wheat grew of its own accord. (Leonard, 1973, p. 12)

Certain varieties of wild wheat have specific advantages. For example, there are varieties with non-shattering ears and firm stems that "hold them to the stalk long after normal spike-lets have flown away on the wind" (Leonard, 1973, p. 9). Other varieties such as Emmer (Triticum dicoccoides) have "an ingenious planting mechanism" (Leonard, 1973, p. 14). As Leonard (1973) explains, this grain:

> … retains such primitive self-propagating devices as the long, stiff bristles, called awns or beards, that caught and traveled in the fur of animals or blew about on strong winds, and the small, spiky hairs along the base of kernels that allowed emmer to anchor itself in the ground. (p. 15)

Africa

Africa is well known for its traditional agricultural practices, especially in the area of biodiversity. There are numerous national Indigenous knowledge and research centres in Africa such as in Benin, Kenya, Ghana, Namibia, Zimbabwe, Burkina Faso, South Africa, and Tanzania. Warren (1992) introduces the following cases to show the care for biodiversity by Indigenous farmers in Africa:

> In Rwanda it was found that farmers "recognise several dozen different potato varieties, which they distinguish according to plant and tuber traits, as well as agronomic and culinary characteristics" (Haugerud and Collinson 1991, p. 5). East African farmers "recognise in maize, as in potato cultivars, important differences in taste, texture, storability, marketability, disease and pest resistance, and response to moisture stress. At least nine possible end uses, many of them simultaneously relevant on a single farm, help to determine the maize genotypes east African farmers prefer" (Haugerud and Collinson 1991, p. 6). "Sustainable agriculture in all nations will require greater scientific respect for, and more effective collaboration with, those who possess the wisdom of generations of 'non-scientific' farming" (Haugerud and Collinson 1991, p. 14). (cited in Warren, 1992, pp. 6-9)

Another example of traditional agricultural practices is the case of farmers in Africa's Sahel region, who plant sorghum and millet crops in fields scattered with a permanent intercrop of *Acacia albida* trees. This improves the water intake efficiency and soil fertility in a way that subsistence farmers can afford. Wolf (1986) mentions that "high yielding varieties can rapidly deplete soil nutrients if they are planted in monocultures by peasant farmers who cannot afford to purchase supplemental fertilizers" (p. 28). In his rediscovery of traditional farming methods, Marten (1986) refers to "principles of permanence," meaning that farmers "use few external inputs, accumulate and cycle natural nutrients effectively, protect soils, and rely on genetic diversity" (cited in Wolf, 1986, p. 32).

Clyde Sanger, a Canadian correspondent for "*Economist*" who worked as a journalist in Africa for eight years, has acknowledged the role of farmers in the conservation of plant genetic resources. Sanger (1998) quotes from Dr. Melaku Worede, who believes local farmers know best:

> By conscious and continuous selection they have created the immense genetic variations on which agriculture depends. Not enough use has been made of farmers' Indigenous knowledge acquired through long years of practical agricultural activities. It is time this knowledge is harnessed to save food security. (p. 1)

America

Sanders has described Chinampa agriculture, a technique used by Aboriginal peoples of central Mexico to cultivate lands to grow maize and other plants from the 14th to the 16th centuries. Sanders has also pointed out that "Because of the high level of the productivity of Chinampa farming, the density of rural settlement was unusually high (perhaps as high as 1,000 persons per Km^2 in some areas)" (cited in Denevan, 1992, p. 34).

The Incas, native to the Andes, built "lines in mountains with terraces even though there was very little soil there" (Weatherford, 1988, p. 85). The terraces, given the way they were built, represent an ideal controlled experimental station for growing a variety of plants in various altitudes and climates. Weatherford (1988) states, "the Indians of the Andes probably did more plant experiments than any other people anywhere in the world" (p. 85).

Weatherford (1988) also notes, "thousands of years before the Incas, the natives ascertained how to produce extremely high yields of potatoes from small plots of land" (p. 86). They not only produced varieties of potatoes in different colours, shapes, and tastes for human and animal food use, but also cultivated slow and fast growing crops that could be stored for shorter and longer periods, as well as numerous other variations. As Weatherford (1988) states:

> The success of these early experimenters remains visible today, not only in the variety of food crops but in the extensive agricultural ruins of the Urubamba Valley stretching from Machu Picchu to the Inca capital city of Cuzco. (p. 87)

Historically, potatoes were the major constituents of the diet of many Indian peoples in America. There is proof that the cultivation of potatoes by the Indians of the Andes goes back about 4,000 years ago (Weatherford, 1988; Crosby, 1972). The Indians were also the pioneers of freezing and drying methods for potatoes and many other root and vegetable crops. It is interesting that "today the agricultural experimentation that began many centuries ago in the Andes continues at the International Potato Institute, located in the suburbs of Lima" (Weatherford, 1988, p. 88).

The Indians of North and Central America used to grow their plants on small plots known as 'a milpa' (Weatherford, 1988; Pleasant, 1989). In contrast to the modern practice of ploughing and cultivating in straight rows, the Indians provided a better support for the soil by planting on small mounds, which results in less soil loss and less runoff problems. This method of planting is very similar to the hilling method that was adopted by white farmers in America from colonial times until the 1930s. Weatherford (1988) states, "since the U.S. abandoned hilling in favour of dense planting, erosion has increased remarkably (e.g. floating of tons of the best soils into the Mississippi River every year)" (p. 88).

Indians used to plant combinations of different crops. For instance, squash was planted in such a way as to be situated (coiled) between corn and bean crops. There are many advantages to planting in such combinations: soil has a finer cover, holds itself better against wind and water erosion, protects its moisture, and absorbs the maximum amount of rainwater. The broad leaves of squash plants prevent the growth of other undesirable vegetation. Beans also fix nitrogen, which enhances the growth of the other two incorporated plants. Weatherford (1988) mentions that recent research shows that the combination of corn, squash, and beans also decreases "consumption by herbivores or the destruction of the plants by insects and other pests" (Pleasant, 1989, p. 43). It has been argued that switching from a monoculture to a poly-culture can increase corn yields by as much as 50 percent.

There are a great many major agricultural plants of Indian origin that were subsequently introduced to other parts of the world. Sunflower, for instance, is a major crop first domesticated by the Indians of North America. Maize is another major plant that is considered to be a "gift" from the American Indian to the world (Barreiro, 1989;

Crosby, 1972; Trigger, 1969). Some scientists have stated that maize plantations go as far as 3500 years ago in some regions (Weatherford, 1991). The impact of the introduction of Maize on population growth in Italy and Spain is an interesting story (Weatherford, 1988). Warman mentions, "maize was transformed from food to raw materials for industry and from food for poor people to feed for animals" (cited in Barreiro, 1989, p. 15). The cultivation of Maize by Indians such as Inca and Hopi farmers in cold and dry areas is another interesting story. As Weatherford (1988) emphasizes, "corn never grows wild; it can survive only under human care" (p. 6).

Weatherford (1988) explains that Indians practiced genetic diversity through a process known today by scientists as "hybridization." For all practical purposes, the Indians learned through trial and error:

> To make the corn grow, the farmers had to fertilize each plant by putting corn pollen on its silk. They knew that by taking the pollen from one variety of corn and fertilizing the silk of another variety, they created corn with the combined characteristics of the two parent stalks. (Weatherford, 1988, p. 90)

By the way of contrast, Warman cites the following example of modern practices:

> In 1974, almost all over the United States, one single variety of maize was planted and this variety was susceptible to a fungus disease. The amount of the crop that was lost because of this lack of variety in the seed plant was more than the consumption of China, Mexico, and Latin America together. (cited in Barreiro, 1989, p. 16)

This is only one of the many mistakes brought on by the negligence of the traditional knowledge built up and carried on by millions of people over thousands of years. In contrast, modern science has repeatedly overemphasized its cyclic discovery of new hybrids. Even now, scientists are theorizing yet another generation of new hybrids that will be more successful in the increasingly polluted environments of today and tomorrow. Quintana states that the Indigenous variety "may yield only 60% of the yields of the improved variety, but under adverse conditions, the Indigenous yield may only drop around 20%, as opposed to 90% or 100% for the hybrids" (cited in Barreiro, 1989, p. 16).

Quintana also emphasizes that "if we make respectful efforts to reach toward that knowledge we may find out that much of what has been derided as Indigenous superstition has scientific basis" (cited in Barreiro, 1989, p. 17).

For generations now, Indians have been seeding plants not on a random basis but rather through selecting the best seeds on the basis of their appearance (Pleasant, 1989; Weatherford, 1988). They have gently converted the forest to farmland without taking away its valuable nutrients. They have also proven themselves capable of returning such farmland back into forest in the same gradual way. Indians believe that "the earth should be allowed to rest after a harvest in the same manner that a woman must be allowed to rest after giving birth" (Barreiro, 1989, p. 12).

A great many other related issues could be mentioned and discussed to illustrate the value and strength of traditional agriculture. Consider, for example, a system of irrigation such as *Qanat,* "an underground aqueduct which taps subterranean water that was used by Iranians for water aided farming in ancient times" (Watson, 1983, p. 43; Leonard, 1973). Mir Abolgasemi (1998) illustrates the importance of Qanat in the dry lands of Iran:

> Many people believe that the civilizations were only born and developed by the side of the rivers and current waters but the astonishing discovery of Qanats in the barren lands of Iran and their role in the formation and continuation of life of cultures and civilizations in these areas is so evident that it calls the genuineness of this hypothesis into question. Qanat, which was created for the first time in Iran, is one of the most visible signs of success of man's struggles to overwhelm shortage of water in dry areas. The amplitude of the qanat indicates a continued, exhausting and hazardous struggle to overwhelm draught. Such a great undertaking undoubtedly would have been impossible to be carried out without a rich and encouraging culture. The same effort had created systems and traditions that influenced social systems and the culture of local people of desert areas. This period of Iran's social history can be gloriously called "The Empire of Qanats". (p. 4)

Also consider the construction of a "most extensive" system of canals in the desert area of North America by the Hohokam (Weatherford, 1991, p. 111). In sum, it can be argued from these examples that most of the credit for modern agriculture really should go to the prehistoric villagers who domesticated wheat, barley, and other agricultural products (Leonard, 1973). Given our hopes that the relatively harmonious relationship between human beings and the environment can be revitalized in a sustainable manner, we have all the more reason to give credit to Indigenous knowledge.

B. Indigenous Knowledge as a Local Living Science

In this section, I am presenting the lessons that I have learned throughout my life experiences implementing agricultural education and extension in my personal, academic and professional life. Needless to say for the benefit of readers I am using a common sense approach (mentioned earlier) to capture my inner thoughts and dialogues and to verbalize and write them down. I am doing this because I would like to re-establish the many concepts and meanings that were lost within me insofar as I was often forced to be detached from the ethics of the sciences (I am mainly referring to the agricultural sciences) that I have acquired and practiced. With this in mind, I am also making every effort to bridge the gap between what is good and positive in traditional and scientific knowledge. The gap between Indigenous and scientific knowledge and the associated communities is rooted in our unjust scientific classification of all areas of the sciences and humanities. Our focus on differences has diminished the interrelation or interconnection between all things. There is a need for rethinking our worldviews. History is the best proof as to how Indigenous communities have always been more conscious and respectful of the relationship among all the components of life (biosphere) including what is underneath the earth, over the earth, and above the earth (all the essential life elements such as soil, water, fire, wind, and what is beyond such as the sun, moon, and stars). Extensive oral and textual knowledge from the past testifies to the intense awareness of Indigenous peoples of all such interconnections.

Many centuries ago, Molla Sadra, one of the greatest philosophers of all-time illustrated the concept “Ha-re-ka-te Joe-ha-ree” (the life motion within). To him, it is not only that life within everything is in motion, but also that there is a fair and continuous exchange (transformation) going on between all things. This means all life forms depend upon one another. Molla Sadra gives many examples, one of the most famous of which is his set of observations about the life cycle a leaf passes through during the course of the changing seasons, including such processes as budding, growing, contributing to the atmosphere, changing colour, beautifying nature, feeding and nesting other creatures, dropping off from the tree, integrating into the soil, and fertilizing it. The life within a leaf is portrayed ever so elegantly and beautifully. One of his other examples concerns the life of a rock that represents millions of years on this earth. This view of life also reminds me of *Mashe-Ferang's* teachings about having respect for life. She taught me how to preserve feathers in my old scratch notebooks. I remember how I thought of them as live creatures, feeding them with sugar granules. Amazingly, some of them multiplied producing baby feathers.

The following sections, covering concepts and meaning that I lost sight of and am now trying to recover, are intended to help the reader to understand the reasons for the existing gap between Indigenous and scientific knowledge (or experiences, communities, societies, worlds, lives). Readers may also see why we need to minimize the gap between such dichotomies. They are complementary to each other, and in fact the survival of future generations may be contingent on the degree to which they can (need to) depend on one another. They are not like two different entities. They are as one single entity with no borderline (and a lot of overlaps). I believe knowledge is and should be thought of as something like the clouds that travel to all ends of the earth without respect for borders. Human knowledge, like agricultural knowledge, cannot be owned. Knowledge evaporates from our thoughts, forms clouds, and pours like rain from the clouds. Knowledge cannot be owned. All knowledge should be considered as one single universal entity owned by our single creator, something to be discovered and shared with a good heart for the good of our physical, mental, and spiritual life.

Importance of History: Learning from our own history

In *Boostan*, Saadi writes, "If you cannot learn from history, how can you learn from a teacher?"[20] I believe that we are the top layer of the building blocks of history. Imagine what is going to happen to us if the blocks below us start falling off. It is important that we are able to rely on those blocks to remain straight and in place. If the underlying building blocks were not built straight, we ourselves cannot stand up straight today. We need to learn from the past, avoid the mistakes that have been made, and build our own building blocks as straight as possible. As the building blocks of history get taller, their structural strength becomes more critical. The wisdoms of our elders tell us how to construct our time (our building blocks) in solidarity with others. It is important that every one of us remain connected in some way or another to strengthen the building blocks of our own time.

I remember a relevant story that *Mashe-Ferang* used to tell me. Anusheervan (A-noo-shee-ra-vawn), a Persian King, was well known for his justice. One day he was traveling through a village. He saw an old man planting walnut trees. Anusheervan knew it could take about twenty years for a walnut tree to produce fruit. So he asked the old man why he was planting something that his age might not allow him to harvest or benefit from. The old man replied that past generations planted for us and we reaped the harvest, and so now we should plant that our future generations can enjoy the harvest. He described how our ancestors were thinking of us and how we should now be responsible enough to think about the future of our children. Anusheervan asked his treasurer to give the old man a reward of one thousand Deenars. After the old man received his reward, he replied to Anusheervan that he had benefited from the harvest of these walnut trees sooner than anybody. Filled with wonder, Anusheervan asked how that could be. The old man answered that if he had been planting something else, then neither could he have benefited from the harvest soon enough nor could he have received the King's attention to get this reward. "As you can see," he added, "I have just received a great benefit from planting walnut trees." Anusheervan became so inspired and excited about the old man's wisdom that he gave the old man an even larger reward of two thousand Deenars.

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[20] This is my own translation and interpretation from one of Saadi's poem in his book of "Boostan."

To revitalize, stabilize, and purify our way of life, we need to study and understand the points of strength and weakness in our past life as well as in our present circumstances. There are numerous untold stories in our past that still need to be revealed and aired out. Many stories that have been written are perhaps far from the truth. We need to find that truth through the stories of those who are wise and trustworthy, such as our parents and grandparents.

Sometimes, the roots of our cultural values are as old as the history of mankind. We should not be afraid of our past even if it is understood to be a dark past. We can benefit from the negative experiences of our past as well as our positive ones. We need to develop some passion for our past life experiences where our basic ingredients are rooted. We have to inspire ourselves to preserve them and pass them on to future generations. The jar we use for preserving our experiences is within us. We should make sure that the jar is scrubbed clean of all impurities and personal prejudices.

All human beings take on the challenge of some basic questions regarding their existence. After all, humans were not put on this earth to lead an aimless life. Some of these basic questions are: Where did we come from? Where do we want to go and where are we supposed to go? Why are we here? What do we want to do, and how do we want to do it, and what are we supposed to do? We need to be sensitive to making history as rewarding as possible in our present life and for the lives of future generations. An old friend of mine used to tell me that we are all makers of history and we better make it good enough so that we can dare to turn our face and look back at it. Suzuki (1989) has said, "Reflecting on our shared history, we can evaluate how far we have come as a species and where we are heading, and we can decide what kind of future we will leave to our children and their grandchildren" (p. 166).

The efforts we make to answer these questions will enhance our understanding of the philosophy of life at both the personal and collective level. We can initiate constructive thoughts by obtaining more information about our past. This kind of personal mobilization is vital and helpful for us if we are to passionately look after the present and plan (predict) the future. We can start synthesizing new hopes or ideas and sharing them with others. We can develop a better and stronger sense of responsibility for ourselves and maybe for others as well.

When we give up answering questions like those above, we close the gateways for thinking, understanding, and discovering. We should nurture ourselves to the best of our abilities. Therefore, being patient and having passion in our search is the key to success in our life adventures. Although a human lifetime is so short, we should never give up and should always be prepared to take on the challenge of new questions. Above all, we should value the life we were given and make sure that we make the best use of it by understanding it and not wasting it.

Searching for the truth is not an easy task and requires lots of time, effort, and patience. A sincere attitude, a degree of humbleness, and a touch of inspiration make up an excellent foundation (bedding) upon which to start our search for the truth. It is like the work of peasants who plant, cultivate, and harvest for a lifetime and make no complaints. No wonder many religions consider farming, like teaching and nursing, to be a sacred responsibility. A continuous struggle makes us strong enough (that we are prepared) to meet the new challenges and realities we encounter on this pathway.

We need to mobilize all our faculties and revolutionize our hearts and minds. We should never give way to overexcitement or the feeling that all is hopeless. Realities sometimes make themselves known in unpleasant forms or under harsh circumstances, and at such times we should be able to recognize and handle them with care. Not only do we need to remain in a state of equilibrium, but we should also try to expand our visionary horizon by unveiling our neutrality. We should be able to listen to our conscience and trust our feelings when it comes to differentiating right from wrong. We should empower ourselves for making decisions, directing our will, and correcting our ideas.

Sharing Indigenous and Scientific Knowledge

One question that has come up for me again and again in the course of my readings is that of how Indigenous knowledge is to be viewed (by whom and for whom?). Generally, Indigenous knowledge is viewed as a knowledge that can only be genuinely retrieved from Indigenous Communities. It is also perceived as a type of knowledge from which Indigenous Communities have the most to gain. But is this really true? This is the question that has been troubling me for a long time. Many people have migrated from their native lands, carrying with them a chest of valuable Indigenous Knowledge in much the same way people migrate from one country to another with their own cultural packages. Isn't it true that people in multicultural societies benefit from one another's cultural values? Isn't it true that people who migrate back and forth to their own native communities also bring back and forth some positive cultural values that benefit their native land and community as well as other lands and communities? Isn't it true that Indigenous communities can benefit from scientific knowledge as much as modern societies can benefit from Indigenous (Traditional) Knowledge? Isn't it true that all traditional and scientific knowledge can be considered a single body of knowledge? It is just a matter of time before the labels that are applied to knowledge are changed. In sum, it does not really matter if knowledge is labelled as traditional, Indigenous, or scientific. What really matters is whether it is a good and positive knowledge that people can benefit from locally and globally. Our critical thinking should take place not on the barren plains of such a conflicting dichotomy, but rather in the wide-open fields of a broad understanding that knowledge comes from all, goes for all, and, in a sense, is all.

Science in Relation to Modern and Traditional Knowledge

The word or concept known as "modern" effectively establishes distance from that which is indicated by the seemingly opposite word or concept known as "traditional." The word "modern" is thus an outgrowth or reaction to the word "traditional," which it is dependent on for its meaning. The word "modern" stems from its traditional root. What is now known as "traditional" was once known as "modern" in the past. What is now known as "modern" will eventually become "traditional" in the future. The two words or concepts are interconnected. They are unified and complementary to each other, rather than representing two opposite ways of seeing, thinking, understanding, and doing. Perhaps, the term "modern" was/is introduced to sensitize consumers to buy more of what are known as modern products. Indeed, this term has become so appealing all over the world where people started becoming alienated from their traditional values of the past and induced to accept a new set of modern values. The similar analogy can also be made between the term modernization and globalization. The era of modernization and post modernization have past, now, it is time to come up with another theory such as globalization. This new theory or era suggests nothing but just another newer version of a more aggressive type of modernization. Perhaps, this one is more well-thought, planned, and equipped with the power of digital culture and the use of communication technology (Internet) to make the world as just one giant community.

However, what is known as modern (progressive) scientific knowledge will eventually become traditional in, say, a couple of hundred years. In fact, that is the way we have already classified the knowledge inherited from the previous generation. The way we have portrayed traditional knowledge to our children, and to our students in the academic environment in particular is very far from being respectful.

Evaluating the Values Behind the Pursuit of Knowledge

When our spiritual roots are dried up, we are all too likely to become dependent on our material desires. Under such circumstances, we have a well-known tendency to accumulate wealth and earthly knowledge to gain some superficial socially accepted values, roles, and responsibilities. We carry out these pursuits under the umbrella of science and religion so as to lead, control, and enslave others. Our intellectual capacities and the efforts we exert often block our deep-down feelings and thoughts and blind us to the real purpose of life and living. We become so proud of our achievements that we forfeit the humbleness necessary to grasp the very genuine spiritual values embedded in us. We often become so fascinated by all these stylish business slogans, terms, and traits as to be tempted into becoming an entrepreneur such that, through our innovative ideas, we can bring changes to our life and to those of other people. We think of knowledge as power, but without knowing what the consequences of our ideas and actions might be or how they are going to affect people around us. We think of carrying out research, but most of our research does not make much sense either for the sake of the creator or humanity. All these endeavours (advanced development activities) appeal to us as a new set of values in this very dynamic world where everything narrows down to economics, doing business, and making money. Success can only happen to those who follow the rules of the game known as today's e-world, which makes use of modern digital cultural values no matter how wrong or harmful they are to humanity and other living things.

Source of Knowledge

I strongly believe in the power of intuition in humans and all other living things, especially in certain animals such as bees, butterflies, birds, dogs, and cats. They always amaze me with the various types of migration they undergo and the keen sensations and perceptions they exhibit. It is hard to believe the powers that lie within nature, and even though we have coined words such as "instinct" and "intuition," we can provide no clear explanation of these remarkable and mysterious gifts. You read about the lives of prophets and popular figures such as Gandhi who have influenced history with their wisdom and knowledge and with all their simplicity and humbleness. They all had one thing in common during their lives and that was the years of living in silence in nature so as to nourish their intuitions. This is how they were able to see things beyond what ordinary people can see. They were also capable of using their intuitions in the service of justice and peace. Nowadays, there are increasing numbers of centres throughout the world for relaxation and having a moment of silence to capture and comprehend the inner dialogue (voices). However, we normally antagonize our very own nature by locking the treasure box of our inner voices and sacrificing our feelings and emotions to our intellectual abilities alone. We act as if our intellectual capacity mattered more than anything else, simply because it helps us to make logical decisions. In one of his poems, Rumi[21] says, "the leg of logical people is wooden – the wooden leg is hardly resistant." This study has brought me to an understanding that source of all knowledge is Almighty God and I am starting a relish of a Divine Wisdom that exists in each and every one of us no matter what religion, spirituality, faith or/and systems of thought we follow.

Closing the gate to our Common Senses for Understanding

In this day and age, few of us give a lot of attention to understanding the importance of learning from Indigenous or Traditional Knowledge and Values and many related issues such as:

Past, Present, and Future
Right and Wrong
Priorities
Worshiping God versus goddess
History
Philosophy
Myth, Truth, and Hope
Kindness and Forgiveness

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[21] Please see the following Web Site address for more information about the life and work of Mevlana Jalal-e-Din Mohammad Mevlavi Balkhi Rumi: http://www.rumionfire.com/

Real Health Hazards (Physical, Mental, Spiritual Distresses)

Nowadays, we give so much attention to material circumstances (even important things such as environmental issues, including plants and animals) that it can be at the cost of the extinction of our very nature and at the cost of the loss of our moral and spiritual values. It seems that we can never learn to have a balanced life. We are always moving to one extreme or another. We normally do not learn our lessons until we survive falling off one side or another of a roof. We have gone so far that we hate to look at the past to see how alienated we have become from our real values or to what degree we have replaced them with shallow, worthless, unimportant denominations that are extremely detrimental to our very nature and habitats.

Generally, the young seem to be reluctant to look at human (our own) history, especially given the numerous stories about conflicts, wars, and the destruction of our own and other living species. Now imagine, with the current rapid technological development and the present miseries that follow from our greed and consumerist habits, how we are going to be viewed by our grandchildren in a hundred years or so. The United Nations and its affiliated organizations such as UNESCO have been struggling to change the course of our beliefs and actions to give support and recognition to accepting diversity, Indigenous people and their knowledge and wisdom, alleviating poverty and malnutrition, eliminating racism, and maintaining a popular movement known since the early 1990's as the culture of peace. We need to evaluate how successful we have been, both theoretically and practically, in fulfilling our high ideals. We are at the point of embarking upon long-term wars and conflicts with no end to it. Even the United Nations, intent upon settling differences in the name of defending our Nations and bringing terrorists to justice is backing up such a war. But whom can we turn to when it comes to determining which nations we should sympathize with and on what justifications they are bringing peace and justice? Finally, what is the definition of terrorism and how do we know who the real terrorists are?

Surely, our children will either regret all these power-hungry (power-thirsty) speeches, deeds, and thoughts of ours or they may just continue in the same fashion or do something worse. It is very important for us to learn from past generations, but what is equally important or more so is to be able to imagine how our achievements might affect future generations. For this reason, we need to change our attitude, and our children's attitudes as well, to one of looking at the past and future in a respectful manner with a deep understanding of our responsibilities toward both. At this point, it is important to mention again that history is the greatest teacher of all. We are all of one origin and we will all return to the same origin, from dust to dust. We are all living on one globe, a place on which should we not permit boundaries or discrimination on the basis of our nationality, skin colour, and/or belief system.

Our Nature versus Nationality (Problem or Barrier of Nationality)

From the standpoint of Eastern Philosophy, human beings are usually confined within a prison of four walls. I have a lot of respect for those who can see outside of their own little box-like room. Consider, for example, the work of a contemporary scholar in the history department at the University of Alberta named professor John-Paul Hemika. Although he is a historian, he does not actually like to be called one. Generally, mainstream historians like to look at the history of ancient civilizations and peoples to understand nationalities and their cultural differences. Hemika, on the other hand, uses a very different perspective to go back before any nationality existed to find out about commonalities and interconnectedness among cultures and languages. Hemika points out "nationalist ideas are modern ideas that belong to modern cultures. These cultures may look different on the surface, they may have different vocabularies but all the concepts are the same. They are essentially interchangeable" (cited in the Folio, 2002, p. 5).

Throughout the history of mankind, it has been the greedy oppressors of the world who have set in motion the possession of all things, the creation of boundaries, the classification and oppression of people, and the domestication of all types of natural resources. History has been repeating itself endlessly as ever greedier people selfishly seek their comfort at the cost of misery and suffering for others. Sometimes we think we are putting our knowledge at work to help others, but this is not always the case. The following story is given to show how we are unconsciously pushing others as well as ourselves into a life of misery:

> A boat docked in a tiny Mexican village. An American tourist complimented the Mexican fisherman on the quality of his fish and asked how long it took him to catch them.
> "Not very long," answered the Mexican.
> "But then, why didn't you stay out longer and catch more?" asked the American. The Mexican explained that his small catch was sufficient to meet his needs and those of his family.
> The American asked, "But what do you do with the rest of your time?"
> "I sleep late, fish a little, play with my children, and take a siesta with my wife. In the evenings, I go into the village to see my friends, have a few drinks, play the guitar, and sing a few songs... I have a full life."
> The American interrupted, "I have an MBA from Harvard and I can help you! You should start by fishing longer every day. You can then sell the extra fish you catch. With the extra revenue, you can buy a bigger boat. With the extra money the larger boat will bring, you can buy a second one and a third one and so on until you have an entire fleet of trawlers. Instead of selling your fish to a middle man, you can negotiate directly with the processing plants and maybe even open your own plant. You can then leave this little village and move to Mexico City, Los Angeles, or even New York City! From there you can direct your huge enterprise."
> "How long would that take?" asked the Mexican.
> "Twenty, perhaps twenty-five years," replied the American.
> "And after that?"
> "Afterwards? That's when it gets really interesting," answered the American, laughing. "When your business gets really big, you can start selling stocks and make millions!"
> "Millions? Really? And after that?"
> "After that you'll be able to retire, live in a tiny village near the coast, sleep late, play with your children, catch a few fish, take a siesta, and spend your evenings drinking and enjoying your friends!"
>
> A German Writer: Heinrich Böll (1917-1985)

Science and Religion

Unfortunately, the monarchs of the world have always used science and religion to classify people and things to preserve their own power and status. Religion at least teaches us that the more knowledgeable you become, the more pious you should become. A verse in the Qur'an states, "The highest among you is the most pious among you." There are important messages in these kinds of teachings, but you will be hard-pressed to find any similar ethical teachings attached to scientific teaching systems except to say that knowledge is power (Francis Bacon's maxim). You will find no definition there as to what extent and in what ways this power should play a role in our individual and collective lives. Religion respects, approves, and emphasizes scientific inquiry, so why shouldn't science take the same attitude toward religion? Why should we think of them as two different entities? Generally, science is thought of as pertaining to the new and future generation, and religion is viewed as a thing of a past belonging to the older generations. Yet, the truth is that religion, culture, myth, and science are all incredibly interwoven and integrated with one another. They are complementary to one another and back each other up. The conflicts between them arise from our yearning and selfish attributes. Religion is often blamed as the root cause of conflicts and war. But just for a moment picture and feel the unjust roles and consequences of science, with all its most recent technological advancements for the mass destruction of the most oppressed people and of other living things throughout the history of mankind, especially given the highly sophisticated manner in which this destruction has taken place during the last couple of decades.

Some scholars like Suzuki (1997) state that the media and science are generally dominated by wealth and that the economic faith of large corporate interests in the global economy is like a religious dogma that is hardly ever tackled. Fortunately, some scientists have gradually started breaking out of their own dogmatic approach by lending their approval to such rich and meaningful phrases as 'the creation of the universe' and 'there was a beginning,' both of which are common expressions in many belief systems. This is of course only a small beginning for scientists stepping into a new era of scientific enlightenment. William E. Seidelman, Professor Emeritus, University of Toronto states "tragically, the same academic and research institutions which gave birth to modern medicine, medical science and medical education also fostered … the greatest programme of human destruction in the history of human kind" (cited in The Gateway, 2002, p. 2).

Science and Culture

Science and culture are two terms that are sometimes placed at opposite poles to one another, yet they are complementary to each other, with less friction between them in comparison to that between science and religion or between religion and culture. Clearly, the stress on the scientific rather than the cultural character of studies, or just having a bias towards one without crediting the other, makes for a one-way study and a lack of vision. Views based on scientific evidence usually appear to be dominant. Currently, however, given the significant increase in the sensitivity of scholars toward cultural studies, the overweening dominance of science over culture shows some sign of letting up. In fact, the terms "culture" and "spirituality" are preferable usages in academia instead of the terms "religion" and "faith." The reason for this is that people, and especially the younger generations, have developed a whole host of negative preconceptions about the terms "religion" and "faith." Misinterpretations and a lack of interest in religious books and thinking have resulted in almost endless misunderstandings and delusions. We are living in an age in which we give so much time to thinking about others and the nature of the world around us (environmental health) but comparatively little to the nature of our own being (spirit, mind, and heart in particular), except for our physical being in line with consumerism. It is also important to re-evaluate our understanding of terms and concepts such as culture, religion, spirituality, faith, science, and knowledge. Moreover, we must ask if these concepts are connected and, if so, how. There is no short and easy answer to such a question like this. However, common sense knowledge suggests there are more commonalities and connections between these concepts than differences. Science delimits us to study things or the nature of things in isolation. Science often compels us to look at outer nature and inner nature as two different worlds, which can mean alienating ourselves from the one or the other. In fact, they are closer than we think. They are one. The problem arises when we give more attention to one (as a separate entity) than the other –and this is what throws us out of balance in our lives. Indeed, this is one of the shortcomings of science that cannot offer us ability to understanding of our inner nature and our deep-down connection with outer nature.

It is very interesting to see how Western scientific groups questioned the very nature of existing religions of the world and the religious thoughts and portrayed them as a dogma and source of fundamentalism and ignorance. Now, it is more interesting to see how the supporters of Western science have adopted a type of religious dogma to preserve their own intellectual rights by their non-universal, non-divine, temporary, and manmade standards, roles, and regulations. Indeed, the saying of Hawking shows here as well how illusion of knowledge makes us to play God.

Mashe-Ferang's Voice is Still at Work

One of the most important things *Mashe-Ferang* taught me was to stay honest and remain committed to my traditional values. She always told me not to hesitate when an opportunity arises to help people. I believe that my understanding of the interconnectedness of all things has its roots in *Mashe-Ferang's* teachings. In fact, she is the one who made me international in my character. My decision to study international/intercultural education, far from being a coincidence, represented the answer to my inner voice. This was a choice that opened many new pathways to recapture and build up my Indigenous values and utilize them in a more effective and positive way. As Kroma (1995) points out:

> Students' prolonged absence from the community deprives them of local knowledge, while exposing them to formal school subjects. This exposure to school knowledge is not usually mediated by their local experience. As a result there is a disjunction between their experience and their school knowledge. (p. 6)

Kroma emphasizes that "popularizing science [and technology], by means of subject matter based on Indigenous knowledge [and technology], would compensate for the increasing loss of such knowledge in Third World communities" (p. 9). In my own case, I view this thesis as another transformative journey to help me compensate for the loss of Indigenous knowledge that has occurred through my formal educational experiences. An Old Persian proverb states, *the treasure that we all have been looking for is here in our soul and in the soil.* One's knowledge, culture, and experiences constitute a store of "precious treasure" to be drawn upon during educational experiences.

My passion for traditional or Indigenous knowledge, culture, and practice has motivated me to link this area of interest to my professional work in the area of agricultural extension in the hope that local people's knowledge and experience will be taken into consideration by extension policy-makers and facilitators. I believe there is a need for the rediscovery and rethinking of extension philosophy by constructing a link to local and/or Indigenous knowledge. Agricultural extension programs have been largely divorced from this critically important humanitarian dimension. Doyle (1989) notes that:

> … America's once-premier agricultural-research complex--the land-grant universities, the state agricultural-experiment stations, and the agricultural extension service--is in decline and is in danger of becoming irrelevant. In contrast, [extension programs] are restoring the former lustre of the land-grant system, and helping to sustain family-farm agriculture while keeping [money] circulating on local Main Street? (p. 5)

Extension is not and should not be limited to agricultural issues. It should also be considerate of human feelings and of our relationships with each other and with nature. It is generally agreed among many scientific scholars that we are still at the beginning of discovering about our relationships to everything around us.

As an extension agent, I strongly believe that agricultural extension agents are the best link between, on one hand, local and Indigenous peoples and, on the other, the top administrators in every extension system. It is our responsibility to bring the importance of Indigenous knowledge to the attention of extension administrators and researchers. It is also important that extension agents and researchers start thinking critically about the weaknesses of modern agriculture and the strong points of traditional agricultural practices (Toh, 1987; Compton, 1989; Kaimowitz, 1990). A more systematic approach needs to be taken such that the voices of Indigenous people and the valuable lessons that they have to offer will be heard (Olupot, 1994). It is time for the agents of change to undergo a process of change themselves. In the eloquent words of a Bengali philosopher who was himself a teacher and a extensionist in rural areas:

> A lamp cannot light another lamp
> unless it itself is also lit.
> A teacher cannot truly teach
> unless he himself is also learning.
>
> (cited in Rivera and Schram, 1987, p. 7)

The philosophical message of the above poem is very much in line with the system of thought of Freire (1972), who believed educators should also learn from educatees. Using the same analogy, extension trainers should likewise go through a process of change by simultaneously "learning" from their trainees as well.

Here at the University of Alberta, in the Faculty of Education, Department of Educational Policy Studies, the opportunity to study International/Intercultural Education has given me a deeper respect for diversity by learning about many different peoples, systems of thoughts, and cultural values. By practicing honesty, patience, and kindness, I have learned many positive and practical lessons from diverse groups of people. I have learned to balance out my system of thought by embracing the two major dimensions of life: the Spiritual and Physical world or, to look at it another way, Divine and Humanitarian values. During my study at Utah State University, I did not have as much of an opportunity to learn about the importance of Indigenous people and the contributions of their knowledge and experiences in the field of Agricultural Education and Extension. I was so fascinated by, and in a way alienated by, western technological progress in the field of agricultural development that I could not see the important roles of Indigenous people or the local farmers nor could I fully appreciate the value of their knowledge, experiences, and wisdom. However, my work experiences as a teacher and researcher in Iran enhanced my understanding of Indigenous people and their invisible roles. But, to a still greater extent, my study at the University of Alberta has helped me and inspired me in many different ways to a greater understanding and appreciation of Indigenous people, their knowledge, their experiences, and the full scope of their contributions.

Chapter 5: Conclusions and Recommendations

Earlier in Chapter One was mentioned that the focus of this study is based on three often-interrelated questions. In this chapter, some specific examples are given for each question with their concluding analyses.

Question One:

Where and how has Indigenous knowledge been considered and integrated into the theory and practice of agricultural extension?

Iran is well-known for some of its traditional irrigation systems such as Qanats (gha-nawtz) and clay pot irrigation. Mir Abolgasemi (1998) points out:

> The idea of modernizing the equipment used in exploitation of water resources in 1319 (1940), launched by the foreign experts, was the main factor responsible for the crisis of water resources in Iran since 1961. In view of the different investment facilities, a return to the ancient irrigation methods, controlling and storing water floods through implementation of small projects for irrigation is the best choice to protect and develop water resources to restore life to the Plateau of Iran. (Plans such as pot irrigation, stamp irrigation, irrigation with salty water, irrigation through water reservoir in the arid regions and cultivation of seeds in the plants' roots). (p. 01)

The pots are made by local rural women and are manufactured from special Indigenous clay. The older women know how to find the best earthen locally that is the most resistible to cracking. The pots are also unglazed. In this clay pot irrigation method, farmers put the pots into the soil so that their bottlenecks come out. Then they put some seeds of watermelon around the pot to protect it and filled it with water and placed a ceramic lid on the top. The suction force is created by soil-moisture tension and/or plant roots. The micro-porous wall of the pots does not allow water to flow freely from the pot, but it guides water seepage from it in the direction where suction develops. The moisture gradually oozes from the pot and provided the ground for the growth of the plant. Depending on the type of plant (small trees, shrubs, and vegetables like: citrus, tea, coffee, maze, bean, tomato, watermelon, and etc…), number and size of clay pots varies with regard to the radius of water requirement and plantation structure. The pot irrigation system is also used most notably in many other regions such as in Africa, India, and Brazil. (Mir Abolgasemi, 1998)

In contrast, building of huge dams near farming communities to introduce and facilitate other methods of irrigation such as drip and trickle irrigation have brought lots of devastations along with their unsuccessful ultimate goal of higher food production. One of the first idea of modernized irrigation system in Iran was introduced by a French expert named Henri Gobler and in less than 20 years from 1966 to 1986 brought many devastation into the socio-economic situation of farming communities (especially among small-scale farmers). Some of them are as follow (Mir Abolgasemi, 1998, p. 3):

- Evacuation of villages and reduction of agricultural activities,
- Expansion of uncontrolled consumption of water, especially the subterranean water reserves. Displacement of population and farming communities
- Increase of 3.5 fold in consumption of underground waters from 1966 to 1986
- Exploitation of surface resources
- Reduction of rural population from 62 percent to 45 percent
- In crease in Importation of strategic agricultural products to Iran
- Alienation of farmers from their traditional agricultural practices by comodification of natural resources under the auspices of macro economic plan and in view of sustainable development aspects and environmental protection for agricultural management
- Elimination of local industry and technology and reduction of values of local productions and works
- Decrease in attention of farmer in their ritual understanding of water as a sacred natural element where they used to transform the barren lands into pleasant gardens over 3,000 years

It is interesting to know how this traditional water usage like many others throughout the world is connected to the spiritual, religious, cultural values of the people and it is well documented in their life history. In this case, Mir Abolgasemi (1998) illustrates how water used to be considered as a valuable and strategic element in Iranian culture:

> In Iran, water is considered a sacred blessing, and is so valuable that it has found a particular place in the beliefs and culture of the people and it is reflected as symbols in their customs and sayings. The respect for water is, to some extent, due to the changing climatic conditions in which the local people live and their constant struggle to get access to water. But the main role in generating this valuable conception of water was played by religions practiced by Iranians. In the Zoroastrian religion, which was the most accepted one among Iranians before the advent of Islam, (by 620 in the Christian calendar) Anahita or Nahid was considered as the goddess of water, symbol of sincerity and loyalty. The importance attached to the water in the Holy Quran breed the concept in the minds of Iranians that this blessing is clean, a cleaner product and a symbol of brightness, life and prosperity. The Iranian literature, art, and culture widely express this high conception of water. One can say the water was always regarded as a sacred, invaluable and strategic substance for Iranians. (p. 4)

Given the example above where and how an Indigenous (traditional) agricultural was/is practical; it is then important to elaborate on how and why Indigenous knowledge need to be revitalized and utilized to help and solve some of the agricultural crisis to the extent is possible and appropriate. Under the following sub-titles you find some examples where it needs to be considered for improving and enhancing of the idea where, how, and why Indigenous knowledge can be incorporated to bring positive contributions.

Framework

One of the important issues that we need to consider is why and how Indigenous knowledge has been, could have been, or should be incorporated into agricultural extension teaching and research. In this regard, the works of activists such as Rajasekaran, Martin, and Warren during the early 1990's are of great value in introducing a framework for incorporating Indigenous knowledge systems into agricultural extension. They consider "local people including farmers, landless labourers, women, rural artisans and cattle rearers as the custodians of Indigenous Knowledge Systems (IKSs)"

(Rajasekaran and Martin, 1990, p. 5). As Scoones notes:

> Understanding farmers' knowledge allows a framework of reference for posing technical and scientific questions in research. It also provides the basis for evolving technological options that are not imposed as alien 'packages' which contradict existing practices. (1989, p. 2)

Therefore, "identifying, documenting and incorporating Indigenous knowledge systems into agricultural extension organizations are essential in order to achieve [an appropriate and] sustainable agricultural development" (Rajasekaran, Martin, and Warren, 1993, p. 2).

Although a great deal of attention is given in theory to farmers' involvement in agricultural research and development programs, in actuality, due to various problems such as insufficient human and financial resources, the participation of local farmers at all times and levels is limited (Rajasekaran and Martin, 1990; Warren, 1991). The scarcities of quality research-minded extension specialists (as well as farmers) make it very difficult to record the local people's knowledge and experiments. In most cases, extension specialists are trained in specific subject matters at an advanced level but in a theoretical manner irrelevant to the local problems. Rajasekaran and Martin (1990) state:

> It would be advisable if they use their academic training along with their field experience for validating farmer experimentation. They should spend at least one day in a week on activities such as problem identification, recording relevant IKSs and presenting the problems and IKSs to the technology development consortium. (p. 5)

Farmers are always in the process of experimenting. They should in fact be seen as the producers of both experiments and resources. Rajasekaran suggests that the work of extension workers is to validate farmers' experiments in terms of profitability, productivity, and sustainability. But the reverse is very true as well, meaning that the work of extension agents and their suggestions should also be validated by the farmers (experimenters) with regard to their appropriateness to the local situation from cultural, social, and economic aspects. "It is important that extension personnel understand the farmers' own criteria when they explore Indigenous approaches to farmer experimentation" (Rajasekaran, 1993, p. 6; Tung, 1992).

When there is a need for introducing a new technological alternative it should be done carefully and responsively in the following manner suggested by Rajasekaran (cited in Mundy and Compton 1991):

> The technological options are developed using diversified sources such as extension agents, NGOs [Non-Government Organizations], research minded village extension workers and farmers. Introduction of any diversified technological option originating from the farmers' own knowledge should be disseminated through proper channels and be utilized based on the farmers' decision-makings. (1993, p. 5)

Incorporating Indigenous knowledge systems into agricultural and extension education programmes will result in achieving a better understanding of the perspectives of local people, bridging the communications gap between outsiders and insiders, recognizing the accomplishments of local farmers, helping outsiders familiarize themselves with local conditions, and increasing the participation of farmers and their organizations in integrating, utilizing, and disseminating what already exists.

Indigenous Research Studies and Objectives

Rajasekaran (1992) conducted a study in three villages of the Union Territory of Pondicherry (India). Indigenous knowledge systems were recorded using farmer participatory methods such as participant observations and unstructured interactions. Rajasekaran found that Indigenous Knowledge Systems (IKSs) can not only provide a frame of reference for strengthening agricultural extension programmes, but have also led researchers to the development of a framework for incorporating IKSs into agricultural extension organizations. Rajasekaran (1992) focuses on the development of a framework for assessing the usefulness of Indigenous knowledge in general. The data collected from such research affirm the value of Indigenous knowledge.

Ferguson and Mkandawire (1993) used both qualitative and quantitative methods to gather information on cropping systems and bean production in the Northern, Central, and Southern Regions of Malawi. Two qualitative longitudinal studies were conducted. One involved 85 women farmers in the Northern Region, and the other involved 20 women farmers in the Central Region. On the basis of the results of these studies, a large-scale survey of 850 farmers was carried out, with men and women farmers from the three regions being interviewed together. Regional variations in bean production were singled out and examined. This study too shows the importance of incorporating local traditional farming practices as a guide for strengthening agricultural extension programmes.

Numerous studies over the last few decades, including the two examples cited above, affirm the need for the implementation of Indigenous knowledge in agricultural education and extension. A new trend has started in which data related to Indigenous knowledge and its implementation are being collected across a vast area of knowledge and research. Unfortunately, the purpose of this new trend remains rather vague in terms of what data is being accumulated, where it is being accumulated, and for whom. It is the responsibility of researchers and policy makers to see whether the 'capitalist' exploitation of Indigenous knowledge maximizes gains for donors (investors, stakeholders) or brings benefits for the originators of the knowledge in question (Agrawal, 1995b).

Indigenous Knowledge and Sustainable Development

No development is sustainable unless it incorporates the knowledge and experiences of local people. Over the centuries, Indigenous people and farmers have developed their own locality-specific knowledge and practices pertaining to agriculture, natural resource management, human and animal health, education, and many other subjects. This complex of knowledge, beliefs, and practices is generally known as Indigenous knowledge. Dissatisfied with the outcome of previous development efforts, a growing number of scientists and development professionals are recognizing that IK provides a valuable resource for sustainable development.

Indigenous knowledge covers all aspects of life and provides a rich resource for sustainable development. This is not to romanticize Indigenous knowledge. It should be viewed critically. Some Indigenous knowledge practices are less efficient than those utilizing modern technologies. Practices that are conscientious when applied to small populations in partial contact with the outside may no longer be appropriate in other places or situations (settings). Nevertheless, important lessons can be learned from Indigenous Knowledge even as it changes and evolves.

Any number of studies has shown that much more attention needs to be given to understanding Indigenous knowledge as a valuable resource. Every conference or symposium relating to Indigenous societies or communities around the world has made recommendations to tap the knowledge and experiences of the Indigenous people to an unprecedented degree. The establishment of national Indigenous knowledge centres in many countries is a promising first step toward preparing a suitable ground. It is now up to all involved, insiders and outsiders (local people as well as scientists and development professionals), in the area of Indigenous and/or scientific knowledge research studies and development to understand, share, and use both local knowledge and scientific knowledge for the betterment of humanity.

Contributions of Women

The roles of and work performed by women in Indigenous communities, *Mashe-Ferang* for instance are generally not as visible or as valued as those of men. Throughout my studies I have found that, for the most part, women are the prime movers behind agricultural activities. It goes without saying, however, that they have been undermined on account of gender differences as well as their invaluable sacrifices, modesty and kindness, and the motherly attitudes that encircle their sincere understandings, feelings and thoughtfulness.

Davis (1995) has shown the important contributions of Afghan women to the economy of the Koochi nomadic tribal community. Davis argues, however, that the role of Pushtun nomad women and their knowledge and experiences pertaining to livestock health care and diseases issues have been excluded, consciously or unconsciously, from certain publications (Awa, 1989; Horowitz and Jowkar, 1992). She mentions that many authors have only credited women in pastoral communities "with respect to the animals solely in terms of milking the livestock, processing milk products, spinning, weaving, and felting the fleeces (Balikci, 1990; Barth, 1961; Glatzer, 1983; Nyrop and Seekins, 1986; Tapper, 1977)" (cited in Davis 1995, p. 19). Davis emphasizes the need for more research studies on the roles of women in Indigenous communities:

> Some of this literature has persuasively argued that the exclusion of women has undermined the long-term effectiveness of many development projects and, moreover, that projects implemented without due consideration for the knowledge and role of women can exacerbate existing power inequalities (Norem et al, 1989) and/or create new perturbations in power structures (Horowitz and Jowkar, 1992). These authors and others, such as Rocheleau (1991), have issued pleas for more fieldwork on, and case studies of, the Indigenous knowledge of women. (1995, p. 4)

Findings from Davis' research indicate that the roles and work of women in agricultural communities is the equal of, and in many cases greater and more valuable than, those of men. Beside milking and herding, the roles of women include care for newborn, sick and hurt livestock, dealing with birth difficulties, feeding, watering, cleaning pens, removing ticks, cleaning and processing animal meats and inner parts, and the cleaning and drying of manure.

Both men and women know, employ, and administer a wide variety of Indigenous treatments, making use of the available (native) plants, minerals, and animal tissues. Local plants and minerals are often used to treat internal and external parasites, as well as other livestock diseases. Animal products such as lung tissue from a diseased or freshly dead animal are used in the preparation of Indigenous 'ear-slit' vaccines for such diseases as contagious caprine pleuropneumonia (Davis et al., in press). Davis' (1995) findings reveal an interesting trend, namely that women display the most detailed ethno-veterinary knowledge in those areas in which they have the most responsibility for animals.

In her comparative study of the knowledge of Koochi men and women, Davis came to the conclusion that women are far more knowledgeable than are men in regard to certain issues, as shown in the following example:

> [When asked about] Mastitis (infection of the udder), dystocias and the care of newborn animals, which animals produce the most milk, diseases or internal parasites they encountered while cleaning slaughtered animals, the women listed a total of four (liver flukes, 2 kinds of intestinal worms and lung worms), as well as two other diseases (anthrax and hardware, a disease of the stomach). The men listed only two parasites (liver flukes and intestinal worms). These responses suggest that women have a more intimate knowledge of internal parasites, as all of those listed by women are known to be important causes of livestock disease in Afghanistan. (1995, p. 6)

The results of Davis' study suggest that future development projects should give more careful consideration to the livestock-related role of pastoral nomad women and to their Indigenous knowledge. This is of particular significance in light of the fact that most livestock development projects in the Middle East focus on men or exclude women. Women's Indigenous knowledge should also be taken into account in the case of other types of development work such as income-generating and human public-health projects. Davis' study also points out that the role of women and their ethno-veterinary knowledge has not been adequately researched in the past. It is hoped that this example will spur interest and future research in this area.

Ritual Aspects of Indigenous Knowledge

Agricultural extension systems lack a vision that adequately takes into account the importance of religion and rituals in livelihood activities when they cross over into disciplines such as agriculture, forestry, and technology. Ritual practices have always been seen as barriers not only to addressing development issues, but also to the utilization of technologies. Extension practitioners have given minimal attention to rituals, as if to diminish their influence, and it is as if agriculturalists had adopted a line during their training programs to be insensitive to ritual practices. But in actual fact, rituals are playing not a less important role but a more important role at the rural and village levels both in terms of human life and environmental management.

Western or international science tends to separate religion and ritual, on one hand, from livelihood, on the other. Furthermore, livelihood activities fall into disciplines, such as agriculture, forestry, natural resource management, aquaculture, human health, veterinary medicine, and livestock management. IK, in contrast, is holistic and culturally bound. Many Indigenous knowledge conferences recommend that professionals should really look more carefully at this issue and make efforts to reduce fragmentation of either IK systems or of disciplines. The dilemma originating from the different approaches of the two knowledge systems – holistic versus disciplinary – came to the fore in discussions on how IK network centres ought to capture Indigenous knowledge systems and their implementations along with ritual practices.

Reichel (1993) illustrates how in Amazonian tribes, for example, religion and ritual can be important in conserving the environment:

> These [tribes] have strong cultural traditions of Indigenous sustainable development, in that they have a model for resource management that allows for long-term maintenance of human and environmental well being without depleting the resource base. The shamans and some ritual specialists assess the trends in land-use patterns and guide the communities' production level as well as their conservation strategies. Shamanism is a political and religious technique for managing societies through certain ritual performances, myths, and worldviews in such a way that a community respects the natural environment and community life as a social common good. (p. 3)

Duhaylungsod's case study from the Laguna uplands in the Philippines illustrates the complexity of local farming systems:

> In contrast to agricultural scientists who often have a specialized, fragmented view of a farming system, farmers commonly take a holistic approach to farming.

> Their practices reflect an understanding of the ecosystem as a whole. The latter also includes the community and its socio-cultural structure. Combining agronomic analysis with local environmental knowledge may help development programmes resolve their current dilemmas. (1993, p. 2)

Question Two:

What differences may be discerned between programs demonstrating a concern for Indigenous knowledge and programs not reflecting such a concern?

It has been and still is a struggle in my mind how is the best way to be just for perceiving and implementing Indigenous knowledge. On one hand, I agree with Battiste and Henderson (2000) stated that the Indigenous knowledge should not be seen as a subtle of Eurocentric knowledge system where:

> Typically, rather than attempting to understand Indigenous knowledge as a distinct knowledge system, researchers have tried to make Indigenous knowledge match the existing academic categories of Eurocentric knowledge. [Then], for knowledge to flourish, scholars need to see Indigenous knowledge as a new *sui generis* (self-generating) path, as a new opportunity to develop greater awareness and to discover deeper truths about ecologies and their forces. (p. 39)

I also accept the fact that often many researchers "have relied on these categories for academic comfort and security, instead of embarking on an intellectual adventure to connect more deeply with Indigenous ecologies" (Battiste and Henderson, 2000, p. 39). On the other hand, I believe that no single way can offer an ultimate universal solution for a single problem. I also believe that we would become more capable of offering better alternative ways to resolve world crisis if we can see beyond our dichotomized world and share our knowledge and experiences in trust and peace. Epistemologist, Morghan Maruyama has argued that:

> Native American epistemologies are in general highly 'mutualistic' and oriented toward holistic and contextual processes. This orientation involves a kind of logic that is symbiotic, relational, qualitative, and interactionalist, and that reflects the notion of many possible directions in the relationship between cause and effect. (cited in Battiste and Henderson, 2000, p. 38)

So far so forth, my lived experience as well as my academic and professional experiences justifies the fact that Indigenous communities have always been more accepting to share their knowledge and experiences with the outside world. Unfortunately, the outside world have been breaking the rules for building a just and trust relationship for continuation of exchange and use of knowledge and experiences. Battiste and Henderson (2000) explained how Indigenous people no longer feeling comfortable to share their knowledge with researchers and are even more suspicious more than ever about the Eurocentric attributions, approaches and intentions. Cajete's writings illustrated the problem by giving some general agreement exists on following three points:

> First, the way in which a people perceives and understands the world is directly dependent on the unique configurations of its belief system. Second, the meanings attached to natural phenomena are directly dependent on the conceptual structure of which they are a part, and this conceptual structure is highly conditioned by the people's culture and system of thought. Third, what constitutes a fact depends on the consensus of the community or group that evaluates what is real and what is not, and such consensuses are based on mutually held belief systems, rather than on rationality (cited in Battiste and Henderson, 2000, p. 37)

Indeed, my approach in understanding of Indigenous knowledge is somewhat holistic and has a root in the system of belief and the cultural package that I am embraced with. My worldview or approach in understanding of Indigenous knowledge is also a bit different since it embraces some aspects of Islamic philosophy and Persian poetry. This study can also be seen as an initiative to start a dialogue for better understanding of Indigenous knowledge between people and me from the same system of thought and cultural setting. I was very young when I first became familiar with the poems of Rumi (Molavi), a very prominent and well known Persian Poet. A couple of years ago I learned that the scholar Colman Bark had translated some of Rumi's poems. In one of Colman's books of translations, Rumi is described as the poet of the heart. The translator of the book also warns readers to prepare themselves before walking into Rumi's life. Reading the poems of Rumi is like bracing yourself for the heat of spiritual love. You are elevated to such a high level of spiritual love that you may never be the same person you were before the poet walked you through awakened you to his spiritual inspirations.

The majority of 265 millions of world Indigenous people lives in South countries and only about 10 percent of them lives in North America (6%), Autralia/Oceania (3%), and Europe (0.1%) (World bank, 1990 data, cited in Geohring, 1993, p. VIII). The dialogue between Indigenous communities and between them and the outside world is not as much broaden in the South countries as it is in North America, Europe, and Australia thru different means of communication such as conferences, Internet, magazines, journals, research and teaching in academia. Therefore, this study may initiate a ground to start a dialogue in the academia of some countries with an oppressive regime where the importance and rights of Indigenous people (their knowledge and experiences) are not recognized.

Question Three:

What lessons can agricultural education and extension specialists (change agents) learn from Indigenous knowledge to enhance the theory and practice of agricultural education and extension, especially in South contexts (southern countries or regions)?

Gradually throughout this study, I came to realize that it was a personal quest for me to bring respect to local knowledge in the hope of revitalizing it and incorporating it into contemporary agricultural education and extension systems, especially at the level of higher education. Agrawal (1995b) in his critical views of scientific and Indigenous knowledge states "the distinction between Indigenous and Western/scientific knowledge can present problems for those who believe in the significance of Indigenous knowledge for development" (p. 433). He makes it clear that those who believe in the significance of Indigenous knowledge for development should not distinguish between Indigenous/traditional knowledge and Western/scientific knowledge as two different entities. In Agrawal's writings, I discovered the shadow of my own thoughts. I was already walking the same line of thought and drawing the same conclusions when his viewpoints created a new heat in my heart and a deeper thought in my mind. His philosophy matches my own philosophy of bringing Indigenous knowledge and scientific knowledge together as one entity on the basis of their similarities wherein they share same divine and humanitarian values and philosophy. Indeed, this is an approach that calls upon the advocates of each side to diminish the gap between the two and minimize all the senseless conflicts between them. We need to focus on commonalities, we need to break through the segregation and classification of traditional and scientific knowledge, and we need to get through to the holders, promoters, and supporters of such a division.

The teachings of Rumi (known as the poet of the heart) has been inspiring me to place my heart (emotional mind) at the centre of the learning-teaching process along with my mental or intellectual capability. The two of them together with my life experiences and knowledge empowers me to get into: understanding by the heart or/and the heart of understanding.

A glance through the history of mankind shows that people benefit and rejoice when commonalities are emphasized and celebrated. Conflicts and segregations have brought nothing but great losses to humanity and life. This is not a suggestion to put aside all differences of opinion. It only recognizes the need to rethink the subject matter of debate and the possible consequences of carrying on that debate before squandering so much energy and resources on it. For example, numerous conflicts are waged as to how scientific and traditional knowledge ought to be perceived, but little attention is given to bottom-line results. We have a huge tendency to put our own objectives first and that can blind us to understanding the concepts behind and beyond our simple, personified, and egocentric mind. A Persian proverb says, "Watch that your knowledge neither blind you nor other people around you." Centuries ago, Nasir-i Khusraw (Naw-sir-e Khows-row, 1004 to 1077), in his renowned book of *Safarnama (Sa-far-naw-meh:* meaning travel letter, 7 year journey from 1042 to 1052)'[22] as well as in one of his poems, mentions that

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[22] Cited in Nasir-i Khusraw's life history: http://www.amaana.org/khusraw/khusraw2.htm and his Book, Safarnama: http://www.mazdapub.com/Nasiri-Khusraw.htm

"it is from us to us," meaning we are continuously experiencing the consequences of our actions (thoughts, words, and deeds).

We need to come up with a new system of thought that allows us to celebrate all system of thoughts to let our commonalities bud out. Is this not the true purpose of the Almighty One, to bring everyone to focus on the "One" and become unified in such a way that everything we say, think, and do is all for God's sake and not for the sake of other things such as gaining fame or wealth or becoming powerful? History has demonstrated to us that no matter how powerful we get, we are still ever so brittle in all of our weaknesses. And no matter how knowledgeable we become, we are not actually gaining power, but are rather coming to understand how small and vulnerable (powerless) we really are. In fact, knowledge should make us ever more humble and pious; if this is not the case, then we should question our knowledge acquisitions in both their content and methodology.

I like to refer to a unique way of understanding that I call the "Indigenous System of Thought" in which we all share the same basic elements – body, mind, spirit, heart, subconscious, and ego – that go into our natural conduct and moral fibre. As professor Wheeler Thackston (cited in Hunsberger, 2000) points out, if we caricature a human being as an agent of evil or good, this:

> … takes us far from the actual human being, who lived and developed over time, who faced the fear of a tortuous spiritual quest and whose passion for life was fuelled by the conviction that everything has a higher purpose, that a wise providence sustains the cosmos and all that is beyond the cosmos, and that his mission was to search for this providential wisdom and preach it to the world. (p. 1)

By way of contrast, consider the following widely quoted saying:

> The future is not completely beyond our control. It is the work of our own hands.
>
> Robert F. Kennedy

In theory, both sayings are very nice and inspiring. But, in practice, Nasir-i Khusraw humbly warns us and encourages us to use our fear of God to build history and be responsive toward our own actions and the possible consequences, no matter how much control we have to bring new change(s). Kennedy, on the other hand, expresses neither fear nor modesty, empowering us to be an agent of change, with no apparent concern on his part for the ethics and morals behind our actions.

The transfer of inappropriate agricultural technologies from the industrial to the south countries was a secondary harm following a transfer of an inappropriate system of thought for agricultural practices. This is only one example, however, of the innumerable instances in which unsuitable western knowledge has been brought into the south countries and put into practice. The following excerpt from an article published in the *Journal of Extension* shows the type of agricultural extension practices that continue to prevail in western industrial countries.

> The primary goal of Colorado State University Cooperative Extension is to help the citizens of our state put to work the knowledge born of the research conducted at our nation's land-grant universities. Free flow of knowledge is at the heart of the land-grant system, and, indeed, our country. The creation of land-grant colleges in 1862 influenced the western landscape by educating farmers and ranchers about the agricultural sciences, which provided the tools they needed to cultivate what was thought to be uninhabitable land. But it wasn't until 1914, when the Smith-Lever Act was passed, and Cooperative Extension educators found their place in modern history, that the western United States became a major entity in the agricultural world marketplace. Throughout its history, however, Cooperative Extension has evolved into a sophisticated network of educators who work diligently to help improve the quality of life for all who access our programs. (Rewerts and Timm, 1996, p. 2)

The system of thought evolving from such a network of educators might be practical in western industrial societies where the lifestyle is rural to urban, and where government development programs and socio-economic policies are in effect. Some south countries have also started experiencing some of these rapid changes. But one research study after another shows that what holds true in a city in one region of the world may not be useful for another city in the same region. The same concept also holds true from one person to another, from one community to another, from one region to another, as well as from one society to another. Studies clearly demonstrated that knowledge derived from land-grant universities was instrumental in making 'uninhabitable' land fit for human beings to live on. Theorists then took the attitude that similar knowledge could be transferred to other parts of world, but the transfer was not carried out in an appropriate way and the results were not the same. Another example clearly shows the same trend of mistakes:

> … in 1990 as result of pressures from the World Bank and the IMF, the National Seed Company of Malawi was privatized, and a major share of the company was purchased by Cargill (Cargill is a privately owned multinational, one of the world's largest grain and seed dealers.). Cargill has since made it clear that the production of bean seed--a self-pollinating crop with little profit-making potential--is not one of their priorities, even though beans are a major source of protein for the population. (Ferguson and Mkandawire, 1996, p. 5)

Ferguson and Mkandawire (1996) believe that "the farming system, plant varieties, and the knowledge of local farmers are interrelated and cannot be easily understood without active involvement of local farmers." They also emphasize:

> a) Agricultural Research Centres and universities often lend support to these business interests. b) Problems in agriculture are seen as technical and production-oriented, rather than social and political in nature, and it is not surprising that technological solutions are usually proposed. c) Agricultural policymakers must be lobbied in order to change their views on what constitutes agricultural modernization and development. (p. 4)

Nowadays many research reports show that one of the most important challenges for extension educators or change agents is to help everyone at the community, government, and academic levels understand the new and rapid transitional living changes.

> In contrast, some of our more traditional rural communities struggle to survive as the traditional agricultural economic base changes. Do these communities sit by and watch as native sons and daughters migrate to cities in search of higher-paying jobs and what they perceive to be a better lifestyle? Or do they draw upon the knowledge and resources available to them to identify opportunities to attract businesses to their communities that will entice their young people to remain? (Rewerts and Timm, 1996, p. 2)

The above quotation brings up the following questions: what knowledge and resources are they referring to and what about local knowledge and resources? What types of businesses might be attracted and how might they be implemented, and by whom, without upsetting local conditions?

> Present-day problems of even traditional Extension clientele include more than farm production concerns, and are no longer solved merely by applying some improved technology. In many cases, today's troubles require working with local groups and stakeholders who have vested interests in the "public" policy alternatives and consequences of the problem. In some cases, technology transfer may be identified as the trouble. (Rilla and Reedy, 1993, p. 1)

Rapid economic growth and agricultural development in North America produced some negative consequences: many small producers failed to survive and a variety of family problems arose. Therefore, it became clear that extension also had to deal with family issues in farming communities. Educators have designed many numbers of projects to help families with extension family policy issues. In addition, extension specialists in 4-H youth development have implemented projects such as the following:

> KIDS' TEAM is a five-year project of University of Nebraska Cooperative Extension funded by a grant from the United States Department of Agriculture. The project's goal is to empower local communities to form coalitions that address the needs of youths and families at risk. (Stevens and Lodl, 1999, p. 2)

People's participation, satisfaction, and expectations are changing as technology and techniques are changing. Public involvement is one of the most important elements of planning for the future (Bodeen and Hilliker, 1999). Public participation provides people with the chance to bring in new ideas and make a difference (Theobald, 1987). The participation of people can inspire them to form a community vision that is relevant to each locality (Bodeen and Hilliker, 1999). Ames (1993) suggests four basic questions for the processes of envisioning: "Where are we now?" "Where are we going?" "Where do we want to be?" and "How do we get there?" (p. 14). Community participation has many advantages when people get actively involved in a just way in decision making that bears upon their own local needs and affairs.

> It provides a valuable visual representation of the future of the community to share with other residents which provides a richness and value that may not otherwise be realized. Finally, it provides a platform for implementation of the community's future vision. (Bodeen and Hilliker, 1999, p. 3)

Warnock (1985) also explains that extension work can sometimes become so stressful as to leave no time for extension educators to be creative (Fetsch, Flashman, and Jeffiers, 1984; Moyers, 1981; Taliaferro, 1979):

> Busyness is an idea killer. Agents, specialists, staff, and volunteers rarely have quiet time for reflective thinking–a precondition to creative problem solving and decision-making. Along with over commitment comes stress that also limits our ability to be creative. Recent *Journal of Extension* articles have described the high stress levels of 4-H agents and Extension families resulting from long and irregular hours of work. (p. 4)

Sustainability, a term used recently in agricultural extension, is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on the Environment and Development 1987, as cited in Hart, 1995, p. 4). Guy and Rogers (1999) note that "Sustainability literature most often focuses on the integration of three major systems: environmental, economic, and social, and addresses quality of life issues" (p. 12). One big shortcoming of the industrial world is the way in which it perceives sustainable development. The industrial world basically looks at the environmental and social aspects of sustainable development from an economic point of view. Everything narrows down to money and dollar sense. Ritual and moral values are of no concern for development, but are rather considered to be a barrier to development. It would be interesting to know what contributions sustainable development has made to human character. We are out of balance in not giving the care and attention to our inner nature that we do to the "outer nature" around us.

There is an increasing demand for health food among people in general and farming communities (The Herb Companion, 1996). Recently, small-scale farmers have shown a lot of interest in fulfilling this market demand, but they are also in need of essential information and resources for growing cash crops based on local needs.

> Fresh herbs are high value crops that can be successfully grown without the use of pesticides. Culinary herb production and marketing information is very important to farmers before they decide whether they can successfully grow herbs. Agricultural and horticultural Extension agents are faced with challenges of coming up with viable cash crops for small-scale farmers. These small-scale farmers, full-time and part-time, need viable and alternative cash crops as well. They often turn to the Extension Service for help. There is little information available on minor or specialty crops since Extension services have traditionally worked with large farm operations. (Gao and Bergefurd, 1998, p.1)

Recommendations

When outsiders bring inappropriate technology, disregarding the needs of insiders (people living in the community), this can lead to nothing but harm. Yet, this has been the characteristic pattern since the Second World War:

> In the years following the Second World War, development cooperation was based on the transfer of technologies to developing countries. According to the model of social labour division in Western cultures, technical knowledge was generated by science and industry, transferred by extension services and utilized by farmers. The introduction of Western technology to non-Western farmers was intended to increase production capacity and improve the market position of the agricultural sector. (Roth, 2001, p. 2)

Again and again, powerful economic pressures have narrowed everything to a moneymaking process through the commercialization of agricultural production at the cost of the elimination of small-scale farming.

> This approach disregarded the fact that the majority of small-scale farmers in developing countries do not have the economic resources to embrace these more expensive technology packages. The passive resistance of the target groups to the new concept of modernization was seen as a sign of traditionalism, ignorance, and a lack of flexibility. So little account was taken of local knowledge and value

> systems that they were in effect marginalized. (Tillmann, 1995, p. 2)

Indigenous science (with all its accompanying elements including knowledge, experience, and technology) is holistic. Assessing and recording Indigenous knowledge by western scientific methods for economic gain is unjust to the very nature of Indigenous knowledge. Western knowledge tends to break down the subjects matters, disregarding the manner in which all things are interconnected. Outsiders need to understand Indigenous knowledge thoroughly, and insiders need to understand the objectives of scientific methods for studying Indigenous knowledge.

> IK should be viewed in the broad context of culture, society, and history. We must recognize the limitations of western science for the assessment of IK in order to interpret our study results correctly. Western science methods can lead to false conclusions when used to assess IK. Western science, lacking the means to understand an Indigenous practice or technology, might belittle it. A classic example is acupuncture. For a long time, western science had no explanation for acupuncture and therefore disregarded it. This is changing and acupuncture is being integrated into western medicine's curricula. (IIRR, 1996, p. 52)

Indigenous knowledge is here to stay and should be valued as providing a backbone for scientific knowledge. Indigenous knowledge is in fact pivotal for scientific knowledge. Indigenous and scientific knowledge are equally valuable forms of knowledge that need to be utilized together. To help build a constructive relationship between Indigenous knowledge and agricultural extension, I would like to recommend the following measures:

- Focusing on commonalities, breaking through the segregation and classification of traditional and scientific knowledge, and getting through to the holders, promoters, and supporters of such a division.
- Implementing a framework for incorporating Indigenous knowledge systems into agricultural extension.
- Combining agricultural and extension education programmes with Indigenous knowledge systems to promote an understanding of the perspectives of insiders (local people) and outsiders (extension change agents) and enhance

the communication between them.

- Acknowledging that Indigenous Local Knowledge and Experiences provide a valuable resource for sustainable development.
- Establishing national Indigenous knowledge centres in many countries as a promising first step to preparing a suitable ground for local people to sustain their Indigenous knowledge, experiences, and locally driven technologies.
- Recording the local people's knowledge and experiments, keeping in mind that the work of extension agents and their suggestions also need to be validated by the farmers (experimenters) for appropriateness to the local situation from cultural, social, and economic aspects.
- Recognizing the important contributions of women in Indigenous communities. Women's Indigenous knowledge, experiences, and their socio-economic roles should also be taken into account. Many research studies from Indigenous communities show that women are far more knowledgeable than are men in regard to many issues.
- Recognizing that rituals play an important role at both the rural (village) and urban level in terms of human life and environmental management.

The problems, issues, and concerns of development present huge and complex challenges for any outsider and/or insider government in particular.

> If development is to take place, if it is to be sustainable, and if the most effective (rewarding) way to succeed is to be found, it must ultimately rest on the initiative and undertakings of millions of people to generate change based on their own values and experiences. The challenge that still remains is one of blending the culturally appropriate and sustainable aspects of Indigenous knowledge with the efficiency and productivity of introduced technologies. (Ferguson and Mkandawire, 1993, p. 16)

Appendix A

List of Abbreviations

APEC	Asia Pacific Economic Cooperation
APO	Asian Productivity Organization
FAO	Food and Agricultural Organization
GAD	Gender and development
GATT	General Agreement of Tariff and Trade
IAD	International Agricultural Development
IFIs	International Financial Institutions
IK	Indigenous Knowledge
IP	Indigenous People
IMF	International Monetary Fund
ISNAR	Institutional Service for National Agricultural Research
KAP	Knowledge, Attitude, and Practice
MAI	Multilateral Agreement on Investment
NAFTA	North American Free Trade Agreement
NGOs	Non-Governmental Organization
OFCOR	On-Farm Client-Oriented Research
SEC	Strategic Extension Campaign
TNCs	Trans-National Corporations
TV	Training and Visit
UNCED	United Nations Conference on Environment and Development
WAD	Women and Development
WB	World Bank
WID	Women and Development
WTO	World Trade Organization

Appendix B

List of Organizations

Bangladesh: Bangladesh Resource Centre for Indigenous Knowledge (BARCIK)

Brazil: Brazilian Resource Centre for Indigenous Knowledge (BRARCIK)

Canada: Canadian International Development Agency (CIDA)

Canada: Centre for Traditional Knowledge (CTK)

Canada: International Development Research Centre (IDRC)

Canada: International Development Research Centre (IDRC)

Centre for International Research and Advisory Networks (CIRAN: Part of Nuffic)

Greece: Elliniko Resource Centre for Indigenous Knowledge (ELLRIK)

India: Centre for Indigenous Knowledge on Indian Bio-resources (CIKIB)

Indonesia: Indonesian Resource Centre for Indigenous Knowledge (INRIK)

Mexico: Mexican Research, Teaching and Service Network on Indigenous Knowledge (RIDSCA)

Netherlands: Indigenous Knowledge and Development Monitor

Netherlands: Netherlands Organization for International Cooperation in Higher Education (Nuffic)

Nigeria: Yoruba Resource Centre for Indigenous Knowledge (YORCIK)

Philippines: International Institute of Rural Reconstruction (IIRR)

Philippines: REPPIKA - Regional Program for the Promotion of Indigenous Knowledge in Asia

Russia: Russian Resource Centre for Indigenous Knowledge (RURCIK)

South Africa: South African Resource Centre for Indigenous Knowledge (SARCIK)

Tanzania: Maasai Resource Centre for Indigenous Knowledge (MARECIK)

United States: Centre for Indigenous Knowledge for Agriculture and Rural Development (CIKARD)

United States: Food and Agriculture Organization (FAO)

Appendix C

List of Useful Websites

Indigenous Knowledge

Indigenous Knowledge and Development Monitor

http://www.nuffic.nl/ciran/ikdm/

Indigenous Knowledge Pages

http://www.nuffic.nl/ik-pages/

Handbook of CIDA Project Planning and Indigenous Traditional Knowledge: Selected List of Centres of Indigenous Knowledge
http://www.kivu.com/CIDA%20Handbook/cidacentres.html

The Ontario Institute for Studies in Education - University of Toronto:
Aboriginal Post Secondary Studies in Education - Canada
Aboriginal Educational Resources Database
http://www.oise.utoronto.ca/~first/

The Harvard University Native American Program

http://gseweb.harvard.edu/~nap/index.htm

Aboriginal Languages: A Curriculum Guide for Kindergarten to Grade 12

http://www.sasked.gov.sk.ca/docs/indlang/index.html

Pan Asia Networking, an Information and Communication Technologies (ICT) program of International Development Research Centre

INDIGENOUS PEOPLE CRITICISE WIPO APPROACH

http--www.ciesin.org-TG-AG-ikuse.html

MSN Search Result for - Indigenous knowledge and agricultural extension

CIKARD INTRODUCTION

NAtive American Indian Art, Culture, Education, History Science -- Gateway

First Nations Site Index...

Welcome to the Programme for TRR

Our Elders_ Interviews With Saskatchewan Elders

AltaVista Canada Search Engine - The Canadian Search Engine _Aboriginal Languages_

BC Ministry of Aboriginal Affairs
http://www.nativeweb.org/
http://www.ezln.org/acerca.en.html
http://www.dickshovel.com/AIMIntro.html
http://www.tibetart.com/
http://www.sacredsites.com/pilgrim/1.html
http://www.dfait-maeci.gc.ca/aboriginalplanet/around/international/arun-en.asp
http://www.ippc.orst.edu/ipmafrica/authors.html
http://www.picatype.com/dig/dn1/dn1aa02.htm
http://www.ankn.uaf.edu/SOP/index.html
http://lucy.ukc.ac.uk/Rainforest/page1g.html
http://www.twnside.org.sg/title/achim-cn.htm
http://www.turtletrack.org/Issues02/Co03092002/CO_03092002_Opportunities.htm
http://www.ciesin.org/IC/cikard/CIKARD.html
http://www.pbs.org/circleofstories/
http://www.worldbank.org/afr/ik/datab.htm
http://www.worldbank.org/depweb/index.html
http://www.picatype.com/dig/d0aa01.htm
http://www.csci.educ.ubc.ca/publication/insights/v07n01/toc.html
http://www.eldis.org/
http://www.ciesin.org/docs/004-176a/004-176a.html
http://www.foodconspiracy.org/news/06_2001/06_2001.html
http://www.google.ca/search?hl=en&ie=UTF-8&oe=UTF-8&q=africa+and+indigenous+agriculture&btnG=Google+Search&meta=
http://www.google.ca/search?q=jojoba+and+Indigenous+knowledge&ie=UTF-8&oe=UTF-8&hl=en&btnG=Google+Search&meta=
http://www.idrc.ca/reports/read_article_english.cfm?article_num=243
http://www.ciesin.org/TG/AG/iksys.html
http://www.ciesin.org/docs/004-173/004-173.html

http://www.scottlondon.com/insight/programs/1996.html

www.IDRC.com/index.htm

http://www.idrc.ca/cbnrm/documents/CBNRM_Toolkit/Vol4Main.htm

http://www.panasia.org.sg/iirr/ikmanual/intro.htm

http://www.idrc.ca/cbnrm/documents/CBNRM_Toolkit/manuals4.htm

http://www.uaf.edu/theatre/litooma/index.html

http://nativeamericas.aip.cornell.edu/

http://www.sacredsites.com/

http://www.sombrilla.ca/

http://www.ainc-inac.gc.ca/pr/info/info123_e.html

Agricultural Education and Extension

Journal of Extension

North American Colleges and Teachers of Agriculture

http://nacta.cses.vt.edu/NACTA/

Centre for Rural Social Research

The World Trade Organization_ A Citizen's Guide

The World Wide Web Virtual Library_ Agriculture

Agriculture country

Home - Sustainable Livelihoods, ENDA_DA Joint Module

http://www.iisd.org/default.asp

Organizations

International Development Research Centre, Ottawa, Canada

SilverLinker - Connecting You to Full Content

Welcome to the Canadian International Development Agency.

Parkland Institute Home Page

http://www.twnside.org.sg/index.htm

Council for a Parliament of the World's Religions

Qualitative Research

Qualis Research Associates, The Ethnograph v5.0

Welcome to the QSR Home Page

winMAX Qualitative Data Analysis

International Institute for Qualitative Methodology

ATLAS.ti - The Knowledge Workbench

The Statistics Homepage

StatSoft Inc.

Perseus Survey Tips

A Research Guide for Students

http://host41.ipowerweb.com/~aresearc/index.html

USF Virtual Library

Additional Topics

APA and many other styles

http://www.docstyles.com/

Search the ERIC Database

Sage Online Home Page

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